Framing the Western Cape water crisis: An analysis of the reporting of five South African publications in 2017 and 2018

by

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Abstract

The Western Cape water crisis has been called the worst drought in over one hundred years, with mainstream media coverage being widespread. The media has long-lasting effects on the way in which society understands different events. Framing consists of selecting certain aspects of reality and making them more salient in communicating text; this in turn promotes a particular problem and therefore specific reaction by those who come into contact with the information in question. By understanding how the drought was framed by a selection of South African publications, researchers can identify and critically examine the dominant media messages being communicated to the public, which in turn has the power to influence behaviours and attitudes towards water conservation. Although academic research in the area of framing is extensive, it lacks exploration from within the South African context. This study explores how a selection of five South African publications – namely the *Cape Argus*, *Die Burger*, the *Cape Times*, GroundUp and News24 – framed the Western Cape water crisis. The hypothesis of this study is that the publications favoured a political narrative above a scientific one in their coverage of the drought. Both quantitative and qualitative research methodologies in the form of content analyses were employed in order to illustrate the saliency of the drought on the media agenda, as well as which messages readers were being exposed to with regards to the water crisis. The main findings of this study were that a scientific narrative was largely lacking from media coverage of the drought.

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Chapter 1: Introduction

"Water problems are primarily people problems or, more precisely, socio-political rather than technical."

- Muller (2018:4)

"For its part, water will continue to teach that the reliability of its flows is determined by people, not hydrology. It will flow when and where needed as a result of the right decisions taken at the right time, informed by the best possible advice."

- Muller (2018:5)

On 1 February 2018, the City of Cape Town (COCT) implemented level 6B water restrictions, limiting citizens to no more than fifty litres of water per person, per day (Head, 2018). Over and above curbing individual consumption, these newly implemented water restrictions had far reaching effects in other domains, including agricultural users being required to reduce their consumption by 60% when compared with 2015 figures, and discouraging the use of borehole water as it takes away vital resources for groundwater reclamation projects. Furthermore, Cape Town's daily water usage target was set at 450 million litres a day, over two-hundred water collections points were to be set up around Cape Town in preparation for the taps being shut off once dam levels reached 13% capacity (residents would have to queue daily to receive 25 litres of water per person, per day), the filling up of pools and cleaning of cars with municipal drinking water was banned, and households using more than 6000 litres of water per month were penalised with additional costs and charges for using excess water. These measures were put in place for one hundred and fifty days from 1 February (2018) and set for reassessment in June 2018 (Head, 2018).

A report released in 2013 by the Intergovernmental Panel on Climate Change (IPCC) confirmed that it is extremely likely that more than half of the observed increase in global average surface temperature from 1950 to 2010 was caused by increases in anthropogenic force (IPCC, 2013). As cited by Janse van Rensburg (2010:3), "not only has human influence been the primary cause for the observed warming of the atmosphere and the ocean since the mid 20th century, but it has also led to changes in the global water cycle, reductions in snow and ice, global mean sea level rise, and changes in some climate extremes". According to Krosnick, Holbrook, Lowe and Visser (2006:7), beliefs about climate change are based on three main factors: first hand experiences, perceived effects of climate change, and information informants, most notably, the media. The researchers also

hypothesise the following link between knowledge and action: "Knowledge about an issue per se will not necessarily increase support for a relevant policy. It will do so only if prevailing attitudes and beliefs about human responsibility is in place to permit the necessary reasoning steps to unfold" (Krosnick *et al.*, 2006:37). This challenges the media to educate, convince and dynamically engage society on the impact and importance of climate change. Peters (2013:14102) argues that the relationship between science and the media has been characterised by metaphors such as "distance, gap, barrier, and fence". One of the reasons for this lack of communication is that scientists and journalists are "like strangers to each other, not able to understand each other's language, and [are] driven by different agendas" (Peters, 2013:14102). Janse van Rensburg (2010:6) states that a significant cognitive attempt is required in order for someone to really understand the causes of climate change, including "its political, economic, social and personal implications". This, in conjunction with the often-conflicting information provided by the media, makes it increasingly difficult for society to draw the correct and desired conclusions about climate change, as well as its causes and its effects.

Framing involves presenting issues in such a way that society can make collective sense of them. As Nisbet (2009:20) explains: "Not [all] citizen[s] care about the environment or defer to the authority of science. Yet newly emerging perceptual contexts hold the promise of resonating with a broader coalition of…social groups." In other words, framing can have a significant effect on how people perceive and understanding different events, thereby influencing behaviour.

1.1. The origins of Cape Town's water crisis

"The politics of water in times of scarcity is not about counting ever-evaporating cubic meters of dam water, as important as this is, but the creeping annihilation of South Africa's fragile social fabric and economic sustainability."

- Merten (2018).

According to Neille, Van der Merwe and Dougan (2017), Mike Muller, former Director General of Water Affairs, told Daily Maverick Chronicle that "a study published for the Western Cape's supply system in 2007 stated conclusively that demand management or encouraging water conservation would not be enough to provide for a time of drought, projected to occur in 2015". As Muller explained:

> The study listed 25 different interventions that Cape Town could undertake to provide more water or to use less water… it estimated how much each of them would cost… Those options were all put on the table as long ago as 2007, with the warning that by 2015 you are going to have to do some of these things, and they weren't done… None of them; except for attempts to manage demand, encourage people to use less and to things like reduce leaks and wastage. Those things were done but it was always recognised in the studies that they were not going to be enough… Cape Town city in particular thought they would be able to get away with doing nothing until 2022 (Neille *et al*., 2017).

In other words, "the first official warnings of potential water scarcity, and of the need to diversify the city's water supply using ground water and other sources, was recorded by the city's own researchers and consultants as early as 2002" (Neille *et al*., 2017). Neille *et al*. (2017) provide a basic timeline breaking down the development of Cape Town's water crisis with more precision: The first water restrictions imposed on municipal users and the agricultural sector occurred in 1999, and in 2002, water restrictions targeted a 10% reduction in consumption. That same year saw potential fines of up to R10 000 or imprisonment of six months implemented for not complying with current water saving targets. Three years later, level 2 water restrictions were implemented, and three years after that the Department of Water and Sanitation (DWS) began a national drive for municipalities to develop water reconciliation strategies. In 2009, the University of the Western Cape (UWC) formed the Institute for Water Studies which subsequently released multiple publications concerning the current state of water affairs in the province. Later that same year, a Water Indaba was held in Cape Town and the Sustainable Water Management Plan for the Cape was formed, and GreenCape released its final Sustainable Water Management Plan in 2012. Pre-feasibility and feasibility studies for the Western Cape Water Supply System Augmentation Project were conducted by the Department of Water Affairs in 2010; the final feasibility study for augmentation of surface water storage in the Western Cape was released in 2012.

In 2014, Cape Town's water demand began to rise and the Water Research Commission (WRC) filed a report regarding increasing water scarcity in coming decades – two years later, the Western Cape regional fruit production sector announced it has suffered losses amounting to R720m due to drought. The year 2016 also saw the implementation of level 3 water restrictions, dam levels dropping to 59,2% in February, and a further reduction of 23,8% by June, bringing dam levels to

35,4%. In 2017, GreenCape filed its Water Market Intelligence report with its outlook on future water stress, this was accompanied by level 3b water restrictions in January and dam levels reaching 25% by March. Cape Town was the second city in South Africa to come "dangerously close" to running out of water; in 2016, water tankers had to be dispatched to Brixton, Greenpoint and Coronationville in Johannesburg due to taps running dry:

> Cape Town is a rapidly urbanising space with a population of 4.5-million, all of whom live in an increasingly dry province and country that have seen weather patterns shift dramatically in recent years. Like many parts of southern Africa, it keenly feels the effects of the El Niño phenomenon, with record high temperatures setting in for weeks at a time (Neille *et al*., 2017).

According to CNN meteorologist Derek Van Dam, "several factors are to blame for Cape Town's stressed water supply, including a growing population, El Niño Southern Oscillation (ENSO) and a rapidly changing climate" (Van Dam, 2017). Quoting the IPCC's fifth assessment report, Van Dam (2017) explains that "long-term climate models indicate a significant drying trend that could reduce annual rainfall by up to 40%". However, Muller (2018:5) contests that outdated engineering as a result of colonisation may be partly to blame for Cape Town's water crisis, suggesting that the origin and characterisation of the water crisis "is linked to the continued influence of European approaches inappropriate to African challenges". According to Muller (2017:11): "Although the South African Weather Service (SAWS) rainfall network has continued to deteriorate, its seasonal rainfall estimates suggest that the 2014/15 and 2015/16 seasons were not far below normal, and only in the second half of the 2016/17 rainfall season did rains fall below 75% of average" (see Figure 1). In other words, "the seasonal estimates from 2010 to 2016 show that limited rainfall was just one part of the problem" (Muller, 2017:11).

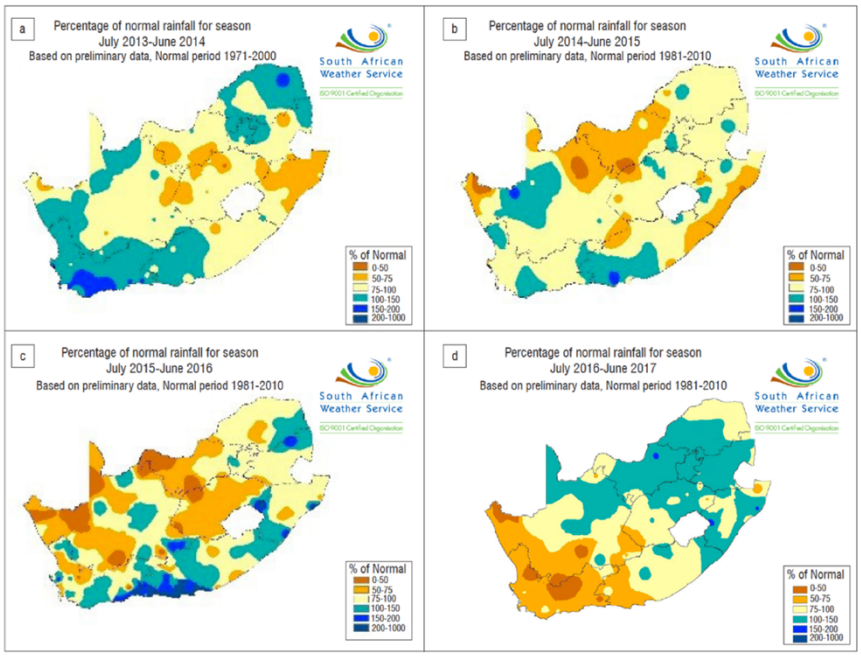

Figure 1: SAWS seasonal rainfall records from July 2012 to April 2017 (Muller 2017:11).

Muller (2018:6) argues that the COCT's water management systems were "excessively influenced by a Eurocentric paradigm, reflected in Europe's Water Framework Directive, that seeks to avoid new infrastructure investments". New water supply investment was delayed because "the City's leadership trusted this European paradigm rather than the tested systems approaches that have kept urban South Africa water secure" and because they "believed that their conservation programmes could sufficiently curtail demand" (Muller, 2018:6). In addition, Cape Town's environmental community opposed construction of the Berg River Dam just before the start of 2000; "it was not needed they said – conservation and alien plant clearance would suffice" (Muller, 2018:9). Not soon after a minor drought emphasised the need for action:

> …without that dam, the City would have come much closer to its 'Day Zero' at the start of 2018. Yet, in 2013, city decision-makers once again stated that new infrastructure would not be needed before 2022/2024, despite recommendations of national government and the Planning Commission. They were convinced that it was their (excellent) conservation programmes rather than three years of good rains that had reduced consumption (Muller, 2018:6).

However, two dry years and one year of drought later, supply restrictions were imposed and "blamed on severe drought (citing rainfall records not representative of the catchments nor acknowledging more nuanced [SAWS] accounts)" (Muller, 2018:6). Muller (2018:6) argues:

> European environmentalists in countries with temperate climates, a substantial endowment of old infrastructure, stable populations and rich economies question the need for new infrastructure. But codified conservation is grossly inappropriate in African countries with much higher population, economic and urban growth all driving increased water use.

In 2017, when asked why solutions to increasing water scarcity were not implemented sooner, government officials noted that the Berg River Dam (its construction completed in 2009 rather than the beginning of the millennium) "had augmented Cape Town's water supply by 20% alongside efforts to curb water consumption", adding that they "could not have proceeded more quickly due to the risk of unnecessarily over-capacitating the supply system at significant cost to the ratepayer" (Neille *et al.*, 2017). According to Executive Mayor Patricia de Lille, as quoted by Daily Maverick Chronicle, the city had to balance water security with maintaining fair tariffs for ratepayers. According to De Lille's spokesperson, Zara Nicholson: "In order to extend available water supply, the city has implemented progressive demand management as the most cost-effective measure, and water rationing has been intensified, which is yielding results to help stretch our water supplies" (Neille *et al.*, 2017). Nicholson added that "rationing is being performed by drastically reducing water pressure to forcibly drive consumption down to the levels required by National Government" (Neille *et al*., 2017).

At the 16 May 2017 Water Indaba, it became obvious that DWS was "well aware of the dire and deteriorating situation", with Deputy Director-General: Strategic and Emergency Projects Trevor Balzer stating in a PowerPoint presentation that "the situation has deteriorated significantly since last year… The current capacity of dams in the [Western Cape] is the lowest recorded in the last 30 years" (Merten, 2018). On 23 May 2017, Western Cape Premier Helen Zille declared the whole province, including its metro, a disaster zone, stating in a public notice published in the provincial Government Gazette: "The disaster declaration will accelerate the [Western Cape] Disaster Management Centre's project 'Avoiding Day Zero', the provinces strategy to ensure that taps do not run dry" (Merten, 2018). The Western Cape administration claimed it asked national government to declare the province a disaster area in 2015 amidst Cape Town instituting its first soft water restrictions but under the 2002

Disaster Management Act, "a premier can make such a declaration for the whole province or parts of it" (Merten, 2018). In January 2016, five regions in the Cape hinterland were declared drought disaster areas by national government, predominantly to benefit from national disaster funds allocated for agricultural relief. Just over a year later and two months after Cape Town moved to level three water restrictions, the metro was declared a local disaster area in March 2017. By September 2017, Cape Town had reached level five water restrictions in an effort to "give the province and its municipalities additional tools for water savings compliance enforcement" (Merten, 2018), where personal daily usage was limited to 87 litres per person, per day. Yet, come October 2017, "Zille continued to blame national government for the dire water straits in the province and city" despite a report released a week prior and published on the city's info dash board showing that level five restrictions were only "adhered to by six out of 10 Capetonians" (Merten, 2018).

By early October 2017 it became clear that the expected winter rains were not going to arrive, prompting De Lille to hold a press conference: "Due to the impacts of climate change and reduced average rainfall… the [COCT] has adopted a scenario called the New Normal… [this] means that, as a permanent drought region, we have to change our relationship with water as a scarce resource" (Neille *et al.*, 2017). After level 6B water restrictions were implemented at the beginning of February 2018, national government reclassified the water crisis as a national disaster on 8 February. On 14 March 2018, South Africa's Cooperative Governance and Traditional Affairs minister Zweli Mkhize declared the prevailing water crisis affecting multiple provinces a national state of disaster, a decision that was gazetted the previous morning (Herman, 2018). This declaration meant that the drought was now classified in terms of Section 27 of the Disaster Management Act meaning it could "now finally access special funds through Treasury reserved for national disasters. As a result, "R6-billion was allocated for disaster relief in the 2018/19 budget", with more to come through in special disaster funds (Herman, 2018).

Conradie (2018) argues that "it is important to distinguish between the water crisis experienced in Cape Town and drought conditions over the Winter Rainfall Zone (WRZ) of South Africa, within which Cape Town and its water supply dams lie". According to Conradie (2018):

> Cape Town and its immediate surroundings experience a Mediterranean-type climate, receiving most of its rainfall from cold fronts which extend northwards from the Southern Ocean and move over the WRZ in winter (generally April-October). Since Spring 2014 (August-October), the WRZ has seen fewer rainy days in the winter half-year, which also on average have yielded less rainfall per event

> (based on analysis by the Agricultural Research Council (ARC), presented in their Umlindi newsletter, and independent research by Piotr Wolski).

The reason for this, according to the ARC (in the Umlindi newsletters), is "fewer land-falling frontal systems impacting the WRZ, which have also tended to be less intense" (Conradie, 2018). This is not in itself unprecedented since "multi-year drought periods and wet periods occur relatively frequently in the WRZ; in fact, natural 'quasi-cyclical' variability has resulted in previous droughts sometimes lasting for 11 years in some regions (1926-1936), while decade long periods that are mostly wetter (e.g., 1950s, 1980s, 1990s) or drier (e.g., 1890s, 1970s, 2000s) than normal are common" (Conradie, 2018). However, as Conradie (2018) explains: "Although the severity of the meteorological drought (there are various types of drought) is not spatially uniform, the period between October 2016 and September 2017 was the driest such period in about 100 years of record keeping at most places that have been assessed". But is climate change to blame for the COCT's water issues? According to Conradie (2018), "many politicians, including the mayor, premier and deputy president" have labelled the drought a clear consequence of climate change, but it is more complex than that:

> This drought is very severe, has lasted longer than 3 years, but is not necessarily strongly linked to climate change. There are political, social and infrastructure management components to the water crisis, which are also complex. It is unlikely that Cape Town is unique in its exposure to these risk factors. The crisis serves as a reminder of our vulnerability to natural rainfall variability, which may in many places be exacerbated by climate change.

In January 2018, GroundUp published an article titled 'Facts and myths about Cape Town's water crisis' in which a set of claims about the drought are critically examined. Increased population growth is considered one of the main culprits of the current water scarcity in Cape Town, however water consumption has stabilised since 2000 with consumption dropping considerably as a result of restrictions and awareness: "If Cape Town had one million instead of four million people, there'd be no problem. But population growth alone doesn't explain the water shortage" (GroundUp, 2018). Another rumour is that farmers are to blame for reduced water resources, however, as GroundUp (2018) argues: "Agriculture is critical to the Western Cape economy, and the loss of crops, even

farms, may be one of the consequences for the city if the dams run dry." GroundUp (2018) also tackles the question about whether the municipality is to blame for the current lack of water resources:

> Though the municipality is ultimately responsible for sorting out the water crisis [through day-to-day management], provincial and national government are also on the hook. The Constitution gives municipalities exclusive power over 'potable water supply systems and domestic waste-water and sewage disposal systems', but higher tiers of government must monitor and support development of local government capacity. And, what is more, they must 'see to the effective performance' of municipalities' water functions.

The Constitution states that everyone has the right to access to sufficient resources, requiring all spheres of government to play an active role in upholding "constitutional duties in realising the right to water" (GroundUp, 2018).

1.2. Problem statement and research question

In a time where water resources are dwindling and citizens are forced to reduce their consumption to below 50 litres of water per person, per day, understanding the best ways of communicating relevant and useful information to the public is vital. The media are responsible for providing society with knowledge about a variety of events in the hope that this knowledge is used to make informed decisions. Unfortunately, science and the media share a strained relationship, where each area is driven by different agendas whilst using different languages. Although, in general, the South African media have given considerable coverage to the WC water crisis (or drought), the quality this coverage is yet to be explored. Olivier (2017) describes the drought as being "driven by politics more than drought", with most coverage being highly politicised, calling into question the leadership capabilities of both the Democratic Alliance (DA) and African National Conference (ANC). This study critically evaluates how four titles from the South African (SA) English media, and one title from the Afrikaans media, framed the Western Cape water crisis, also assessing its saliency on the media agenda, with the aim of identifying whether a scientific or political slant was favoured. Both qualitative and quantitative methods are used, in the form of content analyses.

According to Scheufele and Tewksbury (2007:11), agenda setting refers to "the idea that there is a strong correlation between the emphasis that the mass media place on certain issues and the importance attributed to these issues by mass audiences". This can be based on things such as relative placement or amount of coverage given to a specific topic (Scheufele & Tewksbury, 2007:11). Framing assumes that "how an issue is characterised in news reports can have an influence on how it is understood by audiences" (Scheufele & Tewksbury, 2007:11). Based on the aforementioned definitions, the research question for this thesis is as follows: How did a selection of SA media publications frame their coverage of the WC water crisis? The hypothesis of this study is that a scientific narrative was lacking from the publications' coverage of the water crisis.

1.3. Structure of research

After a brief introduction, providing both context and background to the study (chapter 1), a literature review explores the field of climate communication as a whole, including journalistic norms and values, how climate change is both a scientific and social problem, what prevents society from adapting to climate change, and science in the media (chapter 2). Chapter three elaborates on the main theoretical foundations of the study, namely agenda setting and framing. The research methodology is explained in chapter four followed by coverage of the water crisis (chapter 5) and an analysis of the collected data (chapter 6). The final chapter (chapter 7) consolidates the findings of the study and makes recommendations for future research.

Chapter 2: Literature Review

2.1. Introduction

Steve Curwood, host of US National Public Radio's 'Living on Earth: "Right now we have an alarmed citizenry, but still not a very well-informed one."

- Russell (2008)

Hulme (2009:37) explains that the term 'climate' can be traced back to ancient Greek culture and can be defined as: "…the average course or condition of the weather at a place usually over a period of years as exhibited by temperature, wind velocity and precipitation" (Hulme, 2009:4). NASA (2005) uses the measure of time to differentiate between weather and climate: "Weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere 'behaves' over relatively long periods of time." Changes in climate can also be traced back to Greece when in third century BC Aristotle's student Theophrastus was the first to observe and document how "local changes in climate [were] induced by human agency: the draining of marshes cooled the climate…while the clearing of forests warmed the climate" (Hulme, 2009:37). In other words, "Theophrastus made early connections between deforestation, water management and the cooling and warming of the climate (cited by Boykoff, 2011:6). Earth's climate is regulated "by way of input from energy of the sun and the loss of this back into space… [where] incoming solar radiation enters the atmosphere here on planet Earth and is partly absorbed or trapped and partly reflected back to space" (Boykoff, 2011:6). According to Hulme (2009:2), climate evokes strong emotions within society:

> We expect climate to perform for us; to offer us the weather around which we work and create and within which we relax and recreate. Yet we know too that climate is fickle, with a will and a mind of its own, offering us not only days of tranquility and repose, but also the storms and dangers that our ancestors encountered over centuries and that continue to afflict us today.

Climate is not something that is experienced directly through our senses, unlike the wind or rain, it is instead "a constructed idea that takes these sensory encounters and builds them into something more abstract" (Hulme, 2009:3-4). Climate is also not directly measurable by any manmade tools: "We can

measure the temperature of a specific place at a given time, but no one can directly measure the climate of Paris or the temperature of the planet," (Hulme, 2009:4). Climatic constancy is rare and makes the development of new technologies, practices and systems vital in order to "build social resilience in the face of a capricious climate" (Hulme, 2009:2). Climatic stability is often seen as a prerequisite for the stability of civilisation, however Hulme (2009:2) argues that "all climates are difficult and yield dangers, yet all climates are fruitful and inspire creativity". A 'good' or 'bad' climate is the product of human judgement:

> Is a 'good' climate a stable or a varying one? Is a 'bad climate an unpredictable climate or one that is either too hot or too cold for our predilections? If you were going to design the ideal climate, what would it look like? (Hulme, 2009:2).

The United Nations Framework Convention on Climate Change (UNFCCC) account for both anthropogenic and non-anthropogenic causes in their definition of climate change: "A change of climate which is attributed directly or indirectly to human activity that alters the consumption of the global atmosphere and which is in addition to natural climate variability over comparable time periods" (Pielke Jr, 2005:549). For the purposes of this research, the term 'climate change' refers to changes in the Earth's climate, either directly or indirectly as a result of human activity. According to Boykoff (2011:6), climate change is a broader term accounting for changes in a range of climate characteristics "such as rainfall, ice extent and sea levels" whereas "'global warming' refers to a more specific facet of climate change: the increase in temperature over time". These increases in temperature are not mutually exclusive from other climate characteristics, instead "many other sources and feedback processes contribute to changes across time and space" (Boykoff, 2011:6).

2.2. Climate communication as a field of journalism

Anna Politkovskaya: "The duty of doctors is to give health to their patients, the duty of the singer to sing, and the duty of the journalist is to write what this journalist sees in reality."

\- Davies (2008:7)

According to Boykoff and Smith (2010:210), there are a number of factors that influence climate change coverage, namely: Political and economic effects, ecological and meteorological effects,

scientific issues, and cultural elements. When the global economic recession emerged in 2007, there was a significant downturn in climate change coverage, despite the amount of "climate change [and] global warming coverage [rising] through the end of 2006 and 2007" (Boykoff & Smith, 2010:210). During this time, the absence of a significant ecological event such as the 2005 hurricane Katrina in the Gulf of Mexico, "reduced the number of potential 'news hooks' for climate coverage" (Boykoff & Smith, 2010:210). Scientifically, "the growing consensus that human beings contribute to climate change potentially [serves] to diminish the conflict [driving] media reporting… hence, [it] is now less likely to be seen by journalists as 'news'" (Boykoff & Smith, 2010:210). Finally, in a cultural sense, the content of stories is moving away from global warming or climate change explicitly, and instead focusing more on the resultant impact on carbon trading, energy, energy independence or sustainability (Boykoff & Smith, 2010:210-11). Boykoff and Smith (2010:211) argue:

> Such stagnation combined with elements of contrarian coverage may be interpreted, by climate change policy negotiators and leaders, as reflecting a more general decline in public support for negotiations and institution building related to climate governance.

Furthermore, news coverage does not guarantee public engagement or changes in behaviour, it instead shapes the possibility thereof. Despite this, "media representations – from news to entertainment media – provide critical links between climate science, policy and the broadly-construed public" framing aspects of climate change and drawing attention to "salient actors negotiating the spaces of climate governance" (Boykoff & Smith, 2010:211).

Boykoff and Smith (2010:213) explain that media interactions with environmental politics are dynamic: "Climate science and politics shape media reporting; however, it is also the case that journalism shapes ongoing science governance, policy decisions and activities." Mass media coverage of climate change uses 'frames' to represent environmental issues for policy actors and the public: "These 'framings' are inherent to cognition, and effectively contextualize as well as 'fix' interpretive categories in order to help explain and describe complex environmental processes" (Boykoff & Smith, 2010:213). In other words, journalistic norms and values determine which events become news stories and these processes set the agendas for climate governance. According to Boykoff (2011:100), there are five journalistic norms: 1) Personalisation, 2) Dramatisation, 3) Novelty, 4) Authority-order bias, and 5) Balance. These norms have a significant influence on "the selection of what are 'climate stories' and the content of news stories" (Boykoff, 2011:100).

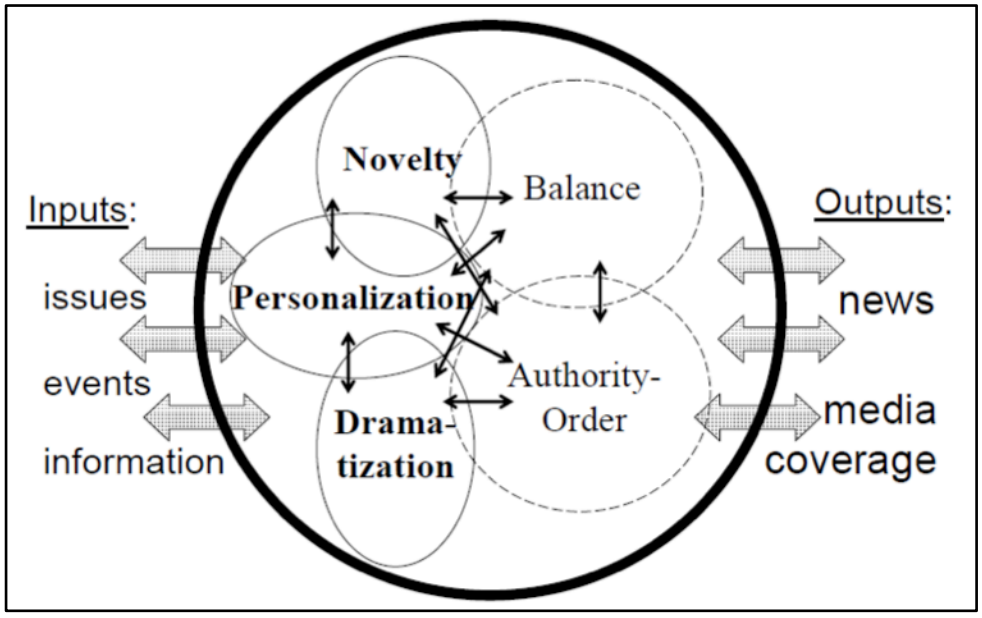

Figure 2: The public arena of mass-media production, where journalistic norms interact (Boykoff, 2011:100).

Journalists use personalisation in an effort to focus on "'charismatic humanoids' struggling in the negotiated spaces of cultural politics and the environment" (Boykoff, 2011:100). Bennett (2002:45) defines personalisation as "the tendency to downplay the big social, economic, or political picture in favour of the human trials, tragedies, and triumphs that sit at the surface of events". By personalising climate stories, focus is shifted away from group dynamics and social processes and is instead driven by individuals: "In this way, there is a tendency to highlight competition between personalities and stories focus on individual claim-makers while de-emphasising issues of power, context and process" (Boykoff, 2011:101). Moreover, highly personalised news can distract citizens from a "more textured analysis of climate science and governance" (Boykoff, 2011:101). Boykoff (2011:104) provides an example of this which consisted of a popular *Fox News* programme 'The O'Reilly Factor' pitting the comments of former US vice-president Al Gore against those of former Alaska Governor Sarah Palin. The segment was titled 'The Climate Feud':

> Palin's authority to speak on the climate derived from an opinion piece she wrote in the *Washington Post* the day before. In that piece, she confused and conflated weather and climate among other issues, where she opined, 'While we recognize the occurrence of these natural, cyclical environmental trends, we can't say with assurance that man's activities cause weather changes. We can say, however, that any potential benefits of proposed emissions reduction policies are far outweighed by their economic costs'. These error-laden claims

> apparently passed editorial correction by the weight of her importance and personality-driven arguments.

The next journalistic norm that contributes to media representations of climate change is known as 'dramatisation'. Bennett (2002:46) describes dramatisation as the process of accentuating "crisis over continuity, the present over the past or future, conflicts". This norm favours the immediate and spectacular, often displacing more chronic issues in the public arena, where events or developments that do not contain an element of controversy and provocation may be deemed less newsworthy. As Ungar (2000:307) explains:

> Climate change, in contrast, is not readily tied to concrete events capable of operating as a beacon or sustaining a hot crisis. Scientists customarily define global warming as a future-oriented problem, with effects predominantly predicted for the middle or end of the next century. From the point of view of the attention economy, a future-orientation creates a clear liability.

In addition, Hilgartner and Bosk (1988:62) write: "Drama is the source of energy that gives social problems life and sustains their growth." Novelty is the third journalistic norm that interacts with both personalisation and dramatization, where "journalists mention the need for a novel news hook in order to translate an event into a 'climate story'" (Boykoff, 2011:104-5). According to Gans (1979:169), there is a "repetition taboo" where "fresh" stories garner popularity over persistent issues. Stocking and Leonard (1990:40) argue: "It ain't news unless its new… [media thirst for novelty] allows persistent, and growing, environmental problems to slide out of sight if there is nothing 'new' to report."

According to Wilson (2000:207): "The underlying causes and long-term consequences are often overlooked in the day-to-day grind to find a new angle by deadline." The need for new stories works in tandem with other newsroom pressures such as representing both the interesting and important dimensions of climate science and governance as well as the fast-moving news cycle (Boykoff, 2011:105). Brown (2009:1) explains:

> Journalists work in a highly competitive environment. The stories environmental specialists produce have to compete for space in their

> papers or on radio and television with football, crime, education, war and terrorism. It takes skill, hard work and ingenuity to get news desks interested in climate change against all the other competition for space and air time. For a relatively slow-burning topic, journalists need a constant stream of new and interesting developments to keep the subject alive.

Boykoff (2011:105) uses Hurricane Katrina as an example of how an extreme climatic event can generate "many dramatic, personalised and novel climate stories". Furthermore, despite remaining uncertainty between hurricane frequency and climate change, "this biophysical and socio-political event generated a great deal of coverage as it tapped into multiple external influences and mobilised these journalistic norms" (Boykoff, 2011:105-6).

Authority-order is the fourth journalistic norm that significantly influences the production of stories on climate change: "Through this value, media workers seek to consult and quote 'actors' and figures such as political leaders, high-profile scientists, government officials, environmental non-governmental organisation (ENGO) figureheads and titans of carbon-based industry in order to find voices and perspectives that authoritatively 'speak for climate'" (Boykoff, 2011:107). Embedded in this is the need to make sense of the complexities of climate science and governance, and therefore a need to turn to leadership, however things can become more complicated in the face of conflicting views. Journalists often contact various experts when getting comment for stories but "overreliance on this norm – in combination with other journalistic values – can come at the sacrifice of giving voice to a wider range of perspectives on the complexities of climate science and governance" (Boykoff, 2011:108).

Balance is the final journalistic norm outlined by Boykoff (2011:108). Entman (1989:30) defines balanced reporting as the process of presenting "the views of legitimate spokespersons of the conflicting sides in any significant dispute, and [providing] both sides with roughly equal attention". Although the norm of balance can provide journalists with a validity check when on deadline, in the case of anthropogenic climate change, "a non-discerning application of this norm can serve to perpetuate informational biases in news reporting" (Boykoff, 2011:108). Grimes (2016) writes:

> Impartiality lies at the very heart of good journalism – avoiding bias is something on which respectable media outlets pride themselves. This is laudable, as robust debate is vital for a healthy media and, by

> extension, an informed society. But when the weight of scientific evidence points incontrovertibly one direction, doggedly reporting both 'sides' equally can result in misleading coverage.

Grimes (2016) defines false balance as presenting "opposing view-points as being more equal than the evidence allows". According to Boykoff and Smith (2010:213), "one of the most prominent challenges facing media coverage of climate change is how to fairly and accurately represent uncertainty". Uncertainty in this case takes on multiple characteristics: "Risk (knowing the odds), uncertainty (don't know the odds but know the parameters), ignorance (unknown unknowns), and indeterminacy (causal chains are open, thus defying prediction)," (as cited by Boykoff & Smith, 2010:213). Boykoff and Smith (2010:214) argue that "sub-dividing considerations of uncertainty in this way can help to distinguish between related yet distinct issues, from the uncertainty-as-ignorance inherent in any scientific undertaking" in order to prevent "intransigent policy actors lessening concern for climate change". In addition, various hazards exist for journalists and editors when considering the 'climate beat':

> Distinct issues in climate science and policy necessitate textured and nuanced treatments in mass media in order to achieve fair, accurate and precise portrayals. However, the tendency to fuse this complex bundle of science, policy and politics into a climate Gestalt summarised variously as 'the climate change debate' or 'climate consensus' has negative consequences for the quality of reporting and, in turn, public understanding and debate (Boykoff & Smith, 2010:214).

In science, the peer review process "drives how (and what) assertions, results and conclusions reach print" (Boykoff & Smith, 2010:214). Although this does not remove conflict completely, it acts as a safeguard against "untested, out-of-context and inaccurate entries into the ongoing and unfolding scientific discourse" (Boykoff & Smith, 2010:214). Journalism instead propels conflict into print: "These varied mobilisations contribute to continued reporting of challenges to the convergent scientific view that human beings contribute to climate change, and therefore also to a weakening of social recognition on anthropogenic climate change" (Boykoff & Smith, 2010:214).

2.3. Framing climate change as a social problem

"An adaptable society is characterized by awareness of diverse values, appreciation and understanding of specific and variable vulnerabilities to impacts, and acceptance of some loss through change."

- Adger *et al*. (2009:350)

2.3.1. The public arenas model

According to McCright and Dunlap (2003:348), the United States environmental community – comprised of members of the environmental movement, sympathetic climate scientists and environmental policy-makers – had successfully defined climate change as a legitimate social problem as early as the beginning of the 1990s. A social problem can be defined as: "A putative condition or situation that (at least) some actors label in the arenas of public discourse and action, defining it as harmful and framing its definition in particular ways" (Hilgartner & Bosk, 1988:70). Environmental issues, including climate change, have to fight for attention in various public arenas: "The level of attention devoted to a social problem is not a function of its objective makeup alone but is determined by a process of collective definition" (Hilgartner & Bosk, 1988:70). In other words, a "social problem exists primarily in terms of how it is defined and conceived in society" (Blumer, 1971:300).

Grundman (2016:562) compares the 'ozone hole' phenomenon with climate change in order to represent how the latter is more a social problem than a scientific one. According to Grundman (2016:562), when atmospheric scientists alerted the world to large-scale ozone loss over Antarctica thirty years ago, it "galvanized the international policy process into adopting binding controls of ozone-depleting substances in the following year". The unfolding events over Antarctica led to scientists and politicians emphasizing the need for scientific consensus and "all emitters of pollutants agreed to a binding treaty that successfully established global targets and timetables" (Grundman, 2016:562). However, when the "same concept of an agreed binding treaty based on scientific consensus was applied to climate change" (Grundman, 2016:562), the response couldn't have been further from consensus. Grundman (2016:562) argues "that the reason for this failure is that unlike the ozone problem, climate change is not a scientific but a social problem". Not only is climate change a social problem, according to Grundman (2016:562), it is also a wicked problem that cannot be solved but instead must be "re-solved and renegotiated, over and over again".

Hilgartner and Bosk (1988:53) propose a model of the social problems process that stresses "the influence of and the interrelationships between institutions and social networks in which problem definitions are framed and publicly presented". The model consists of six main elements that influence the success of a social problem within any given arena of public discourse; these include: 1) Carrying capacity of public institutions (limits the number of social problems during a given period), 2) Dynamics of competition (occurs on two levels, between different problems and between different ways of framing a problem), 3) Principles of selection (influences the probability that a particular social problem will feature), 4) Problem amplifying/dampening feedback (social networks and patterned institutional relations link the public arenas, producing feedback), 5) Communities of operatives (form around social problems, can be consensus or conflict between different departments), and 6) Institutional arenas that serve as "environments" (where social problems compete for attention and grow).

Hilgartner and Bosk (1988:55) emphasise two critical features of the social problems process; the first is that social problems exist in relation to other social problems, and the second, is that they are embedded within a complex institutionalised system of problem formulation and dissemination. Hilgartner and Bosk (1988:58) also state that just because a situation becomes defined as a social problem, it doesn't necessarily mean that the objective conditions have worsened, just like if "a problem disappears from public discourse, it does not necessarily imply that the situation has improved…instead, the outcome of this process is governed by a complex organizational and cultural competition". Framing plays a significant role in the development of social problems, selecting a specific interpretation of reality from a plurality of possibilities: "Which 'reality' comes to dominate public discourse has profound implications for the future of the social problem, for the interest groups involved, and for policy" (Hilgartner & Bosk, 1988:58).

2.3.2. Social limits to climate change adaption

According to Adger *et al.* (2009:394), "adaption to climate change is limited by the values, perceptions, processes and power structures within society". It is important to account for the fact that not all societies are the same and "what may be a limit in one society may not be in another, depending on the ethical standpoint, the emphasis placed on scientific projections, the risk perceptions of the society, and the extent to which places and cultures are valued" (Adger *et al.*, 2009:394).

Adger *et al.* (2009:394) outline four distinct elements "inherent in any society [that] contribute to limiting the successful adaptive response of society". These include ethics, knowledge, risk, and places and culture. Ethics and the way they are manifested by different actors in the diverse goals of adaption is critical: "What may be interpreted as a limit or failure of adaption may in fact be a successful adaption for another actor, resulting from the different priorities and values held within society" (Adger *et al.*, 2009:349). Adger *et al.* (2009:350) also argue that a lack of precise knowledge about future climate impacts usually results in delayed adaption action, "where greater foresight will not facilitate adaption… instead, robust decision-making circumvents the need for precise knowledge". Perceived risk can have limiting factors "if the society does not believe the risk is great enough to justify action" (Adger *et al.*, 2009:350), this results in apathy and a failure to act (i.e. change behaviours). Finally, undervaluing places and cultures can potentially limit the range of adaption activities: "The current methods of valuing loss do not include cultural and symbolic values, leading to an undervaluation in comparison with more easily valued and tangible assets" (Adger *et al.*, 2009:350).

In the case of climate change, the most significant implication of these four observations is that diverse and contested values – which include ethical, cultural, risk and knowledge considerations – "underlie adaption responses and thus define mutable and subjective limits to adaption" (Adger *et al.*, 2009:350). Governance mechanisms that can acknowledge and negotiate the complexity arising from diverse values in a meaningful way is critical if implicit and hidden values and interests are to be identified in advance to adaption interventions (Adger *et al.*, 2009:350).

2.4. Science communication and science in the media

Bucchi and Trench (2014:2) argue that science and society share a complicated relationship "often represented in terms of misunderstandings, gaps to be filled and bridges to be built". The study of science communication "focuses on the hows, whys, and impacts of science messages aimed at non-scientific audiences" (Dunwoody, 2011). According to Dunwoody (2011), science communication assumes that the audience has no prior knowledge or interest in the topic at hand: "As a result, significant emphasis is placed on aspects of messages that explain complex concepts and processes, that lure audiences through narrative – both verbal and visual – and that attend to the complex interplay of evidence with other variables that influence lay audiences' understanding of such things as controversial science issues."

Bucchi and Trench (2014:2) present 10 frequently used terms in their conceptual review of theoretical reflections and research in science communication, these include: "…popularization; model; deficit; dialogue; engagement; participation; publics; expertise; visible scientists; and scientific culture." Despite the increasing attention given to new directions in public engagement, the dominant assumption among scientists and policymakers when scientific controversies arise is that "ignorance is at the root of public opposition" (Bubela *et al.*, 2009:515). As a result, science communication initiatives tend to be "directed at filling in the 'deficit' in knowledge, with the hope that if members of the public only understood the scientific facts, they would be more likely to see issues as experts do" (Bubela *et al.*, 2009:515). Communication efforts to this effect tend to be carried out by "television documentaries, science magazines, newspaper science coverage and more recently science websites and blogs" (Bubela *et al.*, 2009:515). These outlets use different communication models in an effort to popularise scientific phenomena and bridge the knowledge deficit between "experts" and the lay public. Dialogue plays an important role in this process as communicators are required to simplify complex concepts and present them in a way that is easily understandable for someone without in-depth knowledge on the topic at hand.

However, the deficit approach to science communication ignores the fact that knowledge is but "one factor among many influences that are likely to guide how individuals reach judgements, with ideology, social identity and trust often having stronger impacts" (Bubela *et al.*, 2009:515). This model also neglects that society is bombarded with an abundance of competing content choices meaning that "science media outlets reach only a relatively small audience of already knowledgeable science enthusiasts" (Bubela *et al.*, 2009:515). According to Bubela *et al.* (2009:515), a new model of science communication has emerged in recent years known as the 'public engagement' or interactive model that "emphasises deliberative contexts in which a variety of stakeholders can participate in a dialogue so that a plurality of views can inform research priorities and science policy". This two-way participatory process invites the public to become part of the discussion and provide feedback. However, Bubela *et al.* (2009:515) add:

> Advocates for expanding these public engagement initiatives argue that consultation exercises often come too late that lay input is not given enough weight in decision-making and under these conditions the consultation process only serves a public relations function.

Furthermore, the deficit model tends to blame failures in science communication on media shortcomings such as inaccuracies in news coverage and "the irrational beliefs of the public, but it

ignores several realities about audiences and how they use the media to make sense of science" (Bubela *et al.*, 2009:515). The first reality is that science communicators often "expect people to evaluate scientific uncertainty and other evidence based on full knowledge and understanding of the information they receive", but the human mind works differently and instead makes use of mental shortcuts "when trying to interpret scientific uncertainty and other complex information" (National Academies of Sciences, Engineering & Medicine, 2017:32-33).

The second reality is that "a person's characteristics, background, values and beliefs, and cues from mass media shape the linkage between general and scientific knowledge and attitudes" (cited in National Academies of Sciences, Engineering & Medicine, 2017:31). This contradicts the underlying assumptions of the deficit model which predicts that "the more knowledge one has about science and the way it works, the more positive one's attitudes towards science will be and the more consistent one's decisions with scientific evidence" (National Academies of Sciences, Engineering & Medicine, 2017:30).

Lastly, science communicators may underestimate the power of opinion leaders in connecting with key stakeholders and publics. Opinion leaders can include a wide spectrum of role players such as "politicians, business leaders, community figures, journalists and celebrities" (National Academies of Sciences, Engineering & Medicine, 2017:65). Although opinion leaders can be enlisted to help in effective science communication, there can be times where the latter "might contradict scientific consensus or cut against the interests of organised science" (Bubela *et al.*, 2009:515). As a result of these realities, audiences will focus their attention on "certain dimensions of a science debate over others depending on how an issue is 'framed' in news coverage" (Bubela *et al.*, 2009:515). Ungar (2000:298) uses the "knowledge-ignorance paradox" to describe society's complex relationship with science:

> The public's grasp of scientific knowledge in particular is anomalous. Metaphorically at least, scientific issues that manage to break through the veil of ignorance are akin to beacons that spark obsessive interests or distress signals.

Humanity has experienced rapid developments in the quantity and complexity of information within every available faction of society; however, as these "informational explosions spread throughout the economy [they] affect not only what people know, but the social distribution of ignorance as well" (Ungar, 2000:298). As cited by Ungar (2000:298): "In addition, one's degree of grasp (the ratio of

information the human intellectual can handle to the volume of information available) is quickly diminishing while one's [degree of] ignorance is on a fast rise." In order for someone to improve his or her understanding in a certain field, previous "knowledge in [that] area is critical to understanding and assimilating new information… [this] tends to follow a spiral model, with new bits added to prior accumulations" (Ungar, 2000:299). The media are purveyors of knowledge that inform, educate and entertain society. However, news organisations must also take cognisance of "common information resources and probable motivations held by their audience" (Ungar, 2000:299). Restricted access to experts, time constraints and reduced audience reach serve as limitations to conveying information and in most cases require the simplification of messages: "To be understood and retain an audience, the media must either avoid many topics or treat them in a superficial way" (Ungar, 2000:299).

Another limitation is inflated entry costs for speciality knowledges in conversational topics: "Talk… is a social accomplishment that is facilitated by tacit agreements not to threaten the face of others" (Ungar, 2000:299). In most cases, people attempt to find common ground in an effort to "negotiate compatible identities and reciprocal acceptances" (Ungar, 2000:299), but this is difficult to implement when a topic is being discussed in which the person has no previous knowledge, leading them to withdraw from the conversation. Overall, the knowledge-ignorance paradox creates specialist communities of individuals (experts) whose "bubbles of shared knowledge overlap minimally with others" (Ungar, 2000:299).

A vast pool of knowledge in the public domain forces people to selectively deploy their attention. The need to strike a balance between knowledge and ignorance prompts "ecological competition for attention between different domains of knowledge" (Ungar, 2000:300). Factors that influence this competition, i.e. "impact on the types of knowledge people are likely to acquire… and those they are likely to avoid" (Ungar, 2000:300), include personal and social motivations, as well as technological developments. According to Ungar (2000:302):

> Science is poorly equipped to compete in the attention economy that has grown up around the popular culture. As an encoded form of knowledge that needs to be decoded to be accessible to the public, scientific understanding occasions high entry costs and speech barriers. Gaining a passable level of scientific literacy is time consuming and challenging.

In the context of science, "the knowledge-ignorance paradox suggests that what people often lack is the motivation – a payoff for the efforts to gain literacy in a scientific domain" (Ungar, 2000:302).

2.5. Conclusion

By analysing media coverage of science, researchers can better understand the extent of the knowledge gap between science and the media, and the media and lay public. Without understanding the factors that influence these complex relationships, journalists and editors are mostly and often unable to make the desired impacts in society. Some of these factors include politics, economics and culture, among others. Journalistic norms and values also play a role in how scientific information is assimilated and portrayed to the public. This makes identifying the application of these norms in news coverage vital in understanding how these may impact public perception of scientific issues. There are also a wide range of social factors that dictate how and when a particular problem, such as climate change, is adopted by society and considered to be a pressing concern. This process is governed by competition in the public arena of discourse. The fact that climate change is a slow process, only garnering increased media coverage in the event of a crisis, has a negative impact on its saliency in both the media and public domains. The way a society adapts to issues is driven by four elements: ethics, knowledge, risk, and places and culture. When the media diverts from presenting consensus in an effort to favour conflict, this stunts potential adaptive responses to issues like climate change and global warming. Although the media has the power to influence how society interprets various events, previous knowledge has a large impact on how people choose to interact with the information presented to them. By covering scientific issues from a wide range of viewpoints, media organisations are better equipped to deal with this hazard by appealing to a larger audience, thereby increasing reach and influence.

Chapter 3 – Theoretical framework

3.1. Framing

"Journalists do not only influence the media agenda. They do not just write about given topics. Often, they also define what is at issue."

- Blumler and Gurevitch (1995:87)

"The entire study of mass communication is based on the premise that the media have significant effects."

- McQuail (1994:327)

Framing can be defined as a process of sense-making and assumes that "how an issue is characterised in news reports can have an influence on how it is understood by audiences" (Scheufele & Tewksbury, 2007:11). According to Scheufele and Tewksbury (2007:12), framing occurs on both a macro- and micro-level since the way individuals classify information also adds to the framing theory: "As a macro-construct, the term 'framing' refers to modes of presentation that journalists and other communicators use to present information in a way that resonates with existing underlying schemas among their audience." As a micro-construct, framing explains how individuals use the information they receive to form impressions about a given issue (Scheufele & Tewksbury, 2007:12).

As cited by Scheufele and Tewksbury (2007:11-2), the sociological foundations of framing assume that individuals are unable to understand the world fully and consistently struggle to interpret life experiences, arguing that in order to combat this, people apply interpretive schemas or primary frameworks to classify and interpret the world around them in a meaningful way. Scheufele (1999:106) explains that "viewing media or news frames as necessary to turn meaningless and non-recognisable happenings into discernible events" can lead to a story being framed. According to Entman (1993:52), framing consists of selecting "some aspect of a perceived reality and making them more salient in communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation".

As cited by Brüggemann (2014:2), "journalism is a process of public sense-making", where framing "focuses on communication as a process of making sense of the world". Brüggemann (2014:2) adds that "looking at journalistic practice through the lens of the framing approach is relevant for at least two reasons": 1) The framing approach opens up a fruitful perspective on

journalistic practices as it goes beyond and is able to integrate other views on journalism, and 2) Focusing on journalistic practices is a useful extension of framing research. The framing approach opens up a wider perspective than traditional studies of news values and gatekeeping "that mainly see journalism as a process of selecting events for publication drawing on criteria of newsworthiness", instead of focusing on the role journalists play in the "wider process of defining what is at issue in public debates" (Brüggemann, 2014:2). The potential for framing to broaden our perspective on journalistic practice comes from the way newsworthiness and value judgements influence a journalist's decision to "produce texts with certain frames" (Brüggemann, 2014:2). Brüggemann (2014:2) argues that "within the framing approach, the question of how frames get into media content" is still neglected in research, posing three important questions: "To what degree do journalists superimpose their own frames? How do they do so and under which conditions do journalists draw on their own frames rather than just conveying the frames of relevant sources?" (Brüggemann, 2014:3). Brüggemann (2014:3) adds:

> Framing practices [can be conceptualised] on a continuum between passively passing on interpretations provided by other actors (frame sending) and providing the audience with the journalist's individual interpretations of a situation (frame setting).

Frame setting "implies that journalists mostly frame their coverage in line with their personal interpretations of what is at issue", whereas frame sending "denotes the practice of merely relaying the frames as presented by different public actors" (Brüggemann, 2014:7). However, Brüggemann (2014:3) discourages the assumption that journalists pursue one framing practice over another: "Empirically, journalists will to some degree present the frames of other actors and rely on their own frames." It is also erroneous to speak of journalists homogenously with respect to framing practices: "Inevitably, there will be differences between journalists working in different organisational and cultural contexts" (Brüggemann, 2014:3). Instead, the primary challenge when examining framing practices is "to explain under which conditions journalists are likely to pursue frame setting rather than frame sending" (Brüggemann, 2014:3). Nisbet (2010:44) contends that "framing is an unavoidable reality of the public communication process", however "the choice as a journalist, expert, or advocate is not whether to employ framing, but rather how to effectively frame a message for your audience". In addition:

> If journalists, experts and advocates stray from accurately conveying what is conventionally known about an issue, they risk losing public

> trust, [and if] framing appears to serve overtly partisan purposes, then there is the risk that expertise will be quickly and easily reinterpreted by the public through partisan lenses. The result will be increased polarisation rather than increased engagement (Nisbet, 2010:45).

As cited by Nisbet (2010:46-7), perception is reference dependent: "If individuals are given an ambiguous or uncertain situation to consider, the different ways in which a message is presented or framed can result in very different responses, depending on the terminology used to describe the problem or the visual context provided in the message." Scheufele (1999:104-5) focuses on framing as the construction of social reality:

> Media and recipients… [combine] elements of both strong and limited effects of mass media. On the one hand, mass media have a strong impact by constructing social reality, that is, by framing images of reality… in a predictable and patterned way. On the other hand, media effects are limited by an interaction between mass media and recipients. Media discourse is part of the process by which individuals construct meaning, and public opinion is part of the process by which journalists… develop and crystallise meaning in public discourse.

As cited by Vliegenthart and Van Zoonen (2011:104), "statements don't have intrinsic meanings, but only acquire those in a frame that is constituted by context and style". Goffman (1974:24) clarifies this premise, arguing that meanings arise as a result of the processes of interaction, interpretation and contextualisation, with the outcome of those processes being "social frameworks". Gitlin (1980:7) defines 'frames' as "principles of selection, emphasis and presentation composed of little tacit theories about what exists, what happens and what matters". As Vliegenthart and Van Zoonen (2011:105) explain:

> Particular news frames [are tied] to the way news is socially constructed, as a routinised production in which newsworthiness is dependent on how a particular event or story fits the time and space requirements of the news organisation.

Moreover, Vliegenthart and Van Zoonen (2011:105) argue that "neither the qualities of the events themselves, nor the agency of individual journalists can do much against the unrelenting pressure of news as a 24/7 enterprise that has to produce immediate and ongoing output". Collective action frames of social movements present in media discourse and people's everyday conversations "offer ways of understanding that imply the need for and desirability of some form of action" (Gamson, 1992:7). Gamson (1992:134) found that media discourse, rather than informing public understanding, functions as a "spotlight" for particular facts and public figures, with experiential knowledge and popular wisdom taking precedence. This demonstrates "how frames in public conversations emerge from an intricate and situated articulation of a particular issue, popular wisdom, experiential knowledge and media discourse" (Vliegenthart & Van Zoonen, 2011:106). Vliegenthart and Van Zoonen (2011:107-8) summarise several sociological axioms common to frames: 1) They are multiple and can be contradictory or oppositional, 2) They form part of a struggle for meaning between different actors that have unequal material and symbolic resources, 3) That news frames are the result of situated social and routinised processes in which the agency of the individual journalist is relative, and 4) Frames used by audiences are the result of socially situated articulations between particular issues, individual and collective differences, experiential knowledge, popular wisdom and media discourse.

Although the mass media actively set the frames of reference that readers or viewers use to interpret and discuss public events (Tuchman, 1978:ix), "people's information processing and interpretation are influenced by pre-existing meaning structures or schemas" (Scheufele, 1999:105). According to Scheufele (1999:105), there are three different dimensions of news processing: Active processing, reflective integrators and selective scanners. Active processing occurs when an individual seeks out "additional sources based on the assumption that mass-mediated information in general is incomplete, slanted, or in other ways coloured by the intentions of the communicator" (Scheufele, 1999:105). Reflective integrators think about the information they gather from mass media, sometimes talking to others about what they have learned in order to improve their understanding, and selective scanners "use mass media only to seek information relevant to them, [skimming] over or [ignoring] irrelevant or uninteresting content" (Scheufele, 1999:105). In summary: "[Audiences rely on] a version of reality built from personal experience, interaction with peers, and interpreted selections from mass media" (Neuman, Just & Crigler, 1992:120).

3.1.1. A multi-level model for explaining journalistic framing

Linking macro- and micro-level analysis has been used as a postulate in a number of other disciplines such as sociology, social psychology and political psychology. In mass communication, "multilevel analyses can be systematised by using a metatheoretical model for between-level and within-level analyses… [and] because frames have to be considered schemes for both presenting and comprehending news, two concepts of framing can be specified: media frames and individual frames" (Scheufele, 1999:106).

Kinder and Sanders (1990:74) state that frames are both "devices embedded in political discourse" and "internal structures of the mind", which represent media and individual frames respectively. Entman (1991:7) defines individual frames as personal "information-processing schemata" and media frames as "attributes to the news itself". According to Gamson and Modigliani (1987:143), media frames represent "a central organising idea or story line that provides meaning to an unfolding strip of events… the frame suggests what the controversy is about, the essence of the issue". Thus, the framing and presentation of events and news in the mass media can systematically affect how recipients come to understand these events (Price, Tewksbury & Powers, 1995:4).

Entman (1993:53) defines individual frames as "mentally stored clusters of ideas that guide [an individual's] processing of information". According to Scheufele (1999:107), "two frames of reference can be used to interpret and process information: global and long-term political views and short-term, issue related frames of reference". Kinder (1983:414) describes global political views as being the result of certain personal characteristics which have a limited influence on the perception and interpretation of political problems. Conversely, short-term, issue-related frames of reference can have a significant impact on perceiving, organising and interpreting incoming information and on drawing inferences from that information (Pan & Kosicki, 1993:56). Framing research can also be examined in terms of independent or dependent variables.

3.1.2. A typology of framing

Scheufele (1999:108) gives three reasons as to why framing typology is useful when examining media versus audience frames, and frames as independent versus dependent variables:

> First, it classifies existing research on framing with respect to the way in which it has conceptualised frames and the relationships between frames and other variables. Specifically, it permits a direct comparison

> of findings both within cells (i.e., consistency across different studies of essentially the same phenomenon) and between cells (i.e., compatibility of processes at different levels of framing). Second, the typology provides information on how well previous studies have answered questions pertinent to each cell. Third… the typology goes beyond hypothesis testing in relatively isolated or eclectic studies in different disciplines to develop [a common understanding of the concept of framing].

Scheufele (1999:108) provides a guideline of questions (see Figure 3 below) to ask when applying the framing typology: "Classifying and evaluating previous framing studies based on this typology is not a clear-cut task [because] certain studies can fall into more than one cell." According to Scheufele (1999:109), at least five factors influence how journalists frame a given issue: "Social norms and values, organisational pressures and constraints, pressures of interest groups, journalistic routines, and ideological or political orientations of journalists". Scheufele (1999:114) contends that although the aforementioned typology "helps to explicate framing as a theory… when examining media effects, the focus automatically shifts from a mere description of variables or classification of previous research, as provided by the four-cell typology, to processes or the links between key variables".

With respect to *media frames as dependent variable,* we should ask:

RQ1: What factors influence the way journalists or other societal groups frame certain issues?

RQ2: How do these processes work and, as a result, what are the frames that journalists use?

With respect to *media frames as independent variable,* we should ask:

RQ3: What kinds of media frames influence the audience's perception of certain issues, and how does this process work?

With respect to *individual frames as dependent variable,* we should ask:

RQ4: Which factors influence the establishment of individual frames of reference, or are individual frames simply replications of media frames?

RQ5: How can the audience member play an active role in constructing meaning or resisting media frames?

With respect to *individual frames as independent variable,* we should ask:

RQ6: How do individual frames influence individual perception of issues?

Figure 3: Different framing questions (Scheufele, 1999:108)

As a result, Scheufele (1999:114) developed a process model for framing (see Figure 4) that breaks down important links into inputs, processes and outcomes. These links were then broken down even further into four different process: "Frame building; frame-setting; individual-level effects of framing; and a link between individual frames and media frames (i.e., journalists' and elites' susceptibility to framing processes)" (Scheufele, 1999:114-5).

According to Scheufele (1999:115), the term frame building refers to "the processes that influence the creation or changes of frames applied by journalists", where the key question is "what kinds of organisational or structural factors of the media system, or which individual characteristics of journalists, can impact the framing of news content". Whereas agenda-setting is concerned with the salience of issues, frame-setting (or second-level agenda-setting) is concerned with the salience of issue attributes: "The first level of agenda-setting is… the transmission of object salience… the second level of agenda-setting is the transmission of attribute salience" (McCombs, Llamas, Lopez-Escobar & Rey, 1997:704). However, Nelson, Clawson and Oxley (1997:569) emphasised perceived importance of specific frames rather than their salience among audiences as the key variable in frame-setting: "Frames influence opinions by stressing specific values, facts, and other considerations, endowing them with greater apparent relevance to the issue than they might appear to have under an alternative frame".

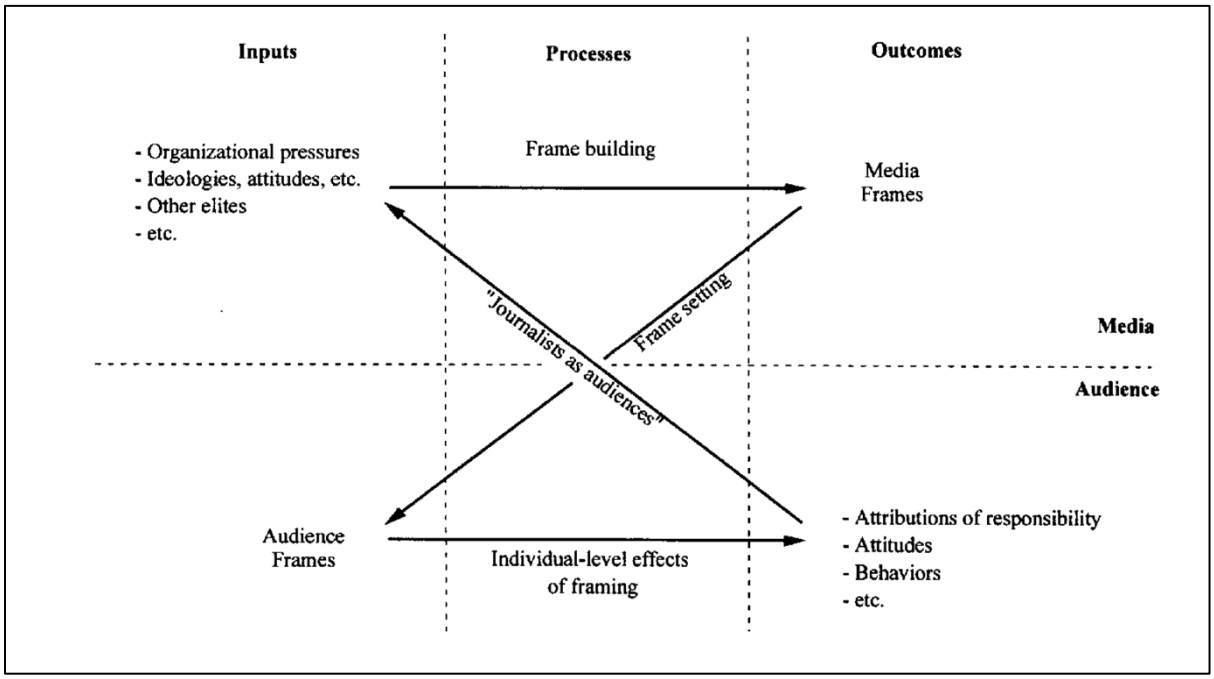

Figure 4: A process model of framing research (Scheufele, 1999:115).

Scheufele (1999:117) argues that most research examining individual-level outcomes of framing assumes a direct link between media frames and individual level outcomes, and although these studies make "important contributions in describing effects of media framing on behavioural, attitudinal, or cognitive outcomes, [they]…provide no explanation as to why and how these two variables are linked to one another". The final link Scheufele (1999:117) cites as needing more attention is that of individual-level variables and media frames (also called 'journalists as audiences'): "It can be expected that journalists, like their audiences, are cognitive misers. Consequently, they are equally susceptible to the very frames that they use to describe events and issues." In other words: "Are journalists' frames of an issue mostly a function of how elites, interest groups, or other sources frame an issue? Or do journalists themselves interpret issues based on frames conveyed to them by other news sources?" (Scheufele, 1999:117; see Figure 4).

3.2. Agenda-setting

"In choosing and displaying news, editors, newsroom staff, and broadcasters play an important part in shaping political reality. Readers learn not only about a given issue, but also how much importance to attach to that issue from the amount of information in a news story and its position. In reflecting

what candidates are saying during a campaign, the mass media may well determine the important issues – that is, the media may set the "agenda" of the campaign."

- McCombs and Shaw (1972:176)

Republican pollster Frank Luntz: *"It's not what you say, it's how you say it."*

- Scheufele and Tewksbury (2007:9)

According to Scheufele and Tewksbury (2007:9), in 1997 Luntz released a 222-page memo in which he presented findings on research he conducted on Republican campaign messages. Luntz found than certain terms and phrases "resonated with specific interpretive schemas among audiences and therefore helped shift people's attitudes" (Scheufele & Tewksbury, 2007:9). Put differently: "the effect of the messages was not a function of content differences but differences in the mode of presentation" (Scheufele & Tewksbury, 2007:9).

Emerging research on framing, agenda-setting and priming has highlighted how media effects are "much more complex in nature that previously assumed… [depending] heavily on people's homogenous networks and their selective informational diets, which [reinforces] existing attitudes rather than [changes] them" (Scheufele & Tewksbury, 2007:10). The year 1970 marks the birth of agenda-setting research in political communication, brought about by the "landmark study" (Scheufele & Tewksbury, 2007:10) by McCombs and Shaw (1972) called 'The agenda-setting function of mass media'. In their research, McCombs and Shaw (1972:177) make the following hypothesis: "The mass media set the agenda for each political campaign, influencing the salience of attitudes toward the political issues." This hypothesis is mirrored by Cohen (1963:13): "The press may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about."

Agenda-setting refers "to the idea that there is a strong correlation between the emphasis that mass media place on certain issues and the importance attributed to these issues by mass audiences" (Scheufele & Tewksbury, 2007:11). Priming can be defined as "changes in the standards that people use to make political evaluations" (Iyengar & Kinder, 1987:63), and is often understood as an extension of agenda-setting for two reasons:

> (a) Both effects are based on memory-based models of information processing. These models assume that people form attitudes based on the considerations that are most salient (i.e., most accessible) when

> they make decisions. In other words, judgements and attitude formation are directly correlated with the ease in which instances or associations could be brought to mind; (b) Based on the common theoretical foundation, some researchers have argued that priming is a temporal extension of agenda setting. By making some issues more salient in people's mind (agenda-setting), mass media can also shape the considerations that people [consider] when making judgements about political candidates or issues (priming) (Scheufele & Tewksbury, 2007:11).

Scheufele and Tewksbury (2007:12) analyse the relationship between agenda-setting (and priming) and framing by looking at how each concept differs in answering three questions: "(a) how messages are created, (b) how they are processed, and (c) how the effects are produced."

In the production of news messages, both agenda-building and frame-building refer to macroscopic mechanisms that deal with message construction rather than media effects: "The activities of interest groups, policymakers, journalists, and other groups interested in shaping media agendas and frames can have an impact on both the volume and character of news messages about a particular issue" (Scheufele & Tewksbury, 2007:12). How news messages that set agendas and frames are processed by recipients is the second area of comparison between different models of media effects:

> In short, the accessibility of an issue – and therefore its place on the issue agenda – may be higher when people attend to messages about it. Thus, agenda setting and framing may appear to operate by similar phenomenological processes. Nonetheless, there is at least one important distinction here. Attention to messages may be more necessary for a framing effect to occur than an agenda setting effect. Mere exposure may be sufficient for agenda setting, but it is less likely to be so for framing effects, (Scheufele & Tewksbury, 2007:13-4).

The final central question in the comparison between agenda-setting and framing is "the locus of cognitive effect" (Scheufele & Tewksbury, 2007:14). Although in both cases "audiences process information provided by the news media and store it in memory", agenda-setting hinges on "memory-

based models of information processing and therefore the accessibility model" whereas framing "assumes that the locus of effect lies within the description of an issue or the label used in news coverage about the issue" (Scheufele & Tewksbury, 2007:14). In other words:

> Agenda-setting effects assume that the locus of effect lies with the heightened accessibility an issue receives from its treatment in the news. Thus, it is not information about the issue that has the effect; it is the fact that the issue has received a certain amount of processing time and attention that carries the effect (Scheufele & Tewksbury, 2007:14).

Therefore, the major psychological distinction between agenda-setting and priming, and framing, is "the difference between whether we think about an issue and how we think about it" (Scheufele & Tewksbury, 2007:14). Scheufele and Tewksbury, 2007:15) argue that the conceptual differences between agenda-setting (and priming) and framing come down to "the distinction between accessibility and applicability effects". The former being accessibility effects (based on memory-based models of information processing), with framing being an applicability effect: "This term refers to the outcome of a message that suggests a connection between two concepts such that, after exposure to the message, audiences accept that they are connected" (as cited by Scheufele & Tewksbury, 2007:15).

Chapter 4 – Research methodology

Arthur Schopenhauer: "Research is to see what everybody else has seen, and to think what nobody else has thought."

- Quote Investigator (2018)

According to Gastrow (2015:50), "a combination of desktop research, key informant interviews, and media content analysis have formed the basis of many studies of representations of science in the media". As Gastrow (2015:50) explains:

> Desktop research has been used to gain contextual knowledge about actors relevant to the science communication process and their inter-relationships. Key informant interviews have also focused on contextual knowledge, as well as aspects of the science communication process and the construction of media representations. Media content analysis has focused on identifying salient features and trends in media representations, and correlating these findings with major political, economic, social and scientific actors and events in order to construct a narrative or model of the relationship between these domains and media representations.

The methodology for this study employs two of these approaches in order to critically examine how four titles from the South African (SA) English media, and one title from the Afrikaans media, framed the Western Cape water crisis, also assessing its saliency on the media agenda, and therefore public agenda. The researcher begins with an introduction explaining the drought and resultant water crisis in the Western Cape, moving onto the role of the media in society and how media representations can have a significant impact on how citizens react and respond to certain issues. These explanations provide context in order to support the research objective of the study.

The five titles in question were chosen for this study for the following reasons: 1) The *Cape Argus* and the *Cape Times* are the only English newspaper dailies specific to Cape Town, 2) *Die Burger* is the largest circulating newspaper title in the Western Cape and Cape Town area, and Afrikaans is one of the eleven official languages and the most dominant language in the province (regarding number of speakers), 3) GroundUp was suggested by Dr Kevin Winter from the Future Water Institute at UCT) because "they seem to be much better and more thoughtful" (Winter, 2017),

and 4) News24 brands itself as South Africa's largest digital publishing house, with over six million unique browsers monthly.

A literature review is conducted in order collect and synthesise existing information, enabling the researcher to find "material related to the conceptual focus of the research problem" (Du Plooy, 2009:60). A literature review also consists of critically reviewing different publications, thereby identifying their strengths and weaknesses (Du Plooy, 2009:63). According to Du Plooy (2009:64), the purpose of a literature review is to answer the following questions: 1) What research has been done in a particular area? 2) What research methods have been used? 3) What results have been generated? and 4) What was done with the results or findings? Du Plooy (2009:65) also states that "the questions asked while reviewing the literature have to be continually revised and [sometimes] redefined". When reviewing previous literature, it is important to ascertain the authenticity and credibility of the information being revised; replication (research that reproduces a previous research study) acts as an independent verification of the former (Du Plooy, 2009:65). In a media setting, "data in magazines and newspapers should be further analysed by considering the use of typography, layout, photography, headings and actual placement on a page" (Du Plooy, 2009:66). The literature review of this study begins by defining both 'climate' and climate change' before exploring 'climate communication as a form of journalism' and 'framing climate change as a social problem'. The final section of the literature review deals with 'science communication and representations of science in the media'; this provides a brief overview of the field of science communication highlighting various themes and challenges.

A theoretical framework provides the point of departure for analysing the collected data in a meaningful way. Framing and agenda-setting are used in this study as they allow the researcher to examine how media messages concerning the drought were portrayed to the public (the media agenda), as well as how often coverage of water scarcity and drought appeared in each publication over the course of the research period (1 January 2017 – 30 April 2018). According to Scheufele and Tewksbury (2007:11), agenda-setting refers to "the idea that there is a strong correlation between the emphasis that the mass media place on certain issues and the importance attributed to these issues by mass audiences". This can be based on things such as relative placement or amount of coverage given to a specific topic (Scheufele & Tewksbury, 2007:11). Framing assumes that "how an issue is characterised in news reports can have an influence on how it is understood by audiences" (Scheufele & Tewksbury, 2007:11).

Both quantitative and qualitative research are used in the research design of this study. All qualitative research shares a common focus: "To interpret and construct the qualitative aspects of communication experiences" (Du Plooy, 2009:30). These include ontological (nature of being),

theoretical (concerned with the theory of a subject area of study), epistemological (the theory of knowledge and the distinction between justified belief and opinion) and methodological (a system of methods used in a particular area of study) assumptions. Du Plooy (2009:35) provides a list of assumptions that researchers can use to guide them when applying the qualitative approach to communication research: 1) Reality is subjective (ontology), 2) Insights into communication can be derived from the subject's perspective (ontology and methodology), 3) The research process is mostly based on inductive reasoning which is used to understand patterns in observations (theory), 4) Reality can be described in terms of meanings that people attach to communication experiences (epistemology), 5) Multiple sources of knowledge exist and can be used to explore, interpret and understand a subjective world (epistemology), 6) Qualitative themes and categories can be developed as methods to explore and describe meanings communicated in particular contexts (methodology), 7) Research questions can guide the types of observation to be made in order to understand a communication phenomenon (methodology), and 8) Observations can be analysed thematically and holistically within contexts that consist of interrelationships (methodology).

Quantitative research, also known as positivist or empirical research, "restricts itself to data experiences and rejects any form of speculation" (Du Plooy, 2009:22). When applying the quantitative approach to communication research, Du Plooy (2009:30) provides the following guidelines: 1) An objective and value-free reality exists that can be researched (ontology), 2) Communication can be objectively measured (ontology and methodology), 3) The research process is mostly based on deductive reasoning (theory), 4) Reality can be explained in terms of generalisations or universally valid laws (epistemology), 5) Empirical observations, experience and/or experiments are the only source of real knowledge (epistemology), 6) Methods that are objective can be developed to study reality (methodology), 7) Hypotheses formulated about the nature of this reality can be accepted or rejected based on findings (methodology), 8) Hypotheses can be used to predict and control that which is being studied (methodology), and 9) Observations can be measured in quantitative terms (methodology).

	Quantitative	Mixed	Qualitative
Scientific method	Deductive or 'top-down', researcher tests hypothesis and thoery with data	Deductive and inductive	Inductive or 'bottom-up', researcher generates new hypotheses and grounded theory from data collected during fieldwork
View of human behaviour	Behaviour is regular and predicatable	Behaviour is somewhat predictable	Behaviour is fluid, dynamic, situational, social, contextual and personal
Most common research objectives	Description, explanation and prediction	Multiple objectives	Description, explanation and discovery
Focus	Narrow-angle lens, testing specific hypothesis	Multi-lens focus	Wide-angle and "deep-angle" lens, examining the breadth and depth of phenomena to learn more about them
Nature of reality	Objective (different observers agree on what is observed)	Commonsense realism and pragmatic view of world (i.e. what works is what is "real" or true)	Subjective, personal and socially constucted
Nature of observation	Attempt to study behaviour under controlled conditions	Study behaviour in more than one context or condition	Study behaviour in natural environments and the context in which the behaviour occurs
Form of data collected	Collect quantitative data based on precise measurement using structured and validated data collection instruments (closed ended-items, rating scales, behavioural responses	Multiple forms	Collect qualitative data (e.g. in-depth interviews, participant observation field notes and open ended questions), the researcher is the primary data collection instrument
Nature of data	Variables	Mixture of variables, words and images	Words, images and categories
Results	Generalisable findings	Corroborated findings may generalise	Particularistic findings, representation of insider (i.e. 'emic') viewpoint, present multiple perspectives
Form of final report	Statistical report (e.g. with correlations, comparisons of means and reporting of statistical significance of findings)	Eclectic and pragmatic	Narrative report with contextual descriptions and direct quotations from research participants

Figure 5: Emphases of Quantitative, Mixed and Qualitative Research (Johnson and Christensen, 2014:34).

Firstly, a quantitative content analysis of each publication will be conducted in order to gage the saliency of the water crisis on the South African media agenda. For the print publications, the number of articles dedicated to the water crisis versus other topics will be calculated and represented in a table (i.e. *Cape Argus, Cape Times and Die Burger*). The process by which this is completed differs between print and online publications. The lifestyle pages and business reports will be omitted from the calculations as this research is purely concerned with news reporting of the water crisis. For the online publications (i.e. GroundUp and News24), the saliency of the water crisis will be judged by how many articles concerning the water crisis/drought were published monthly during the time period of the study. Dominant frames will then be identified and coded in the collected articles (those concerning the drought/water crisis) from each publication (print and online) as well as tallied. This will illustrate which frames were most dominate in each of the publications.

The second phase of the research will consist of a qualitative content analysis of news articles. According to Du Plooy (2009:58), "in order to formulate sub-problems or sub-issues a content analysis of… different media and messages is required". The encoding characteristics of varying media differ, prompting the following questions:

- How are the codes used in the different media (e.g. type of address, language, layout, colour, typography, visual images, sound effects, music, or combination of audiovisual codes)?
- How do clients (respondents) perceive and interpret the codes and the message content?
- What core messages are being marketed?
- What persuasive techniques are used? (Du Plooy, 2009:58).

In this section, articles relevant to the water crisis will be analysed, as well as what messages were conveyed to readers, and in what way. The researcher's hypothesis is that the publications in question framed their coverage from a political view point rather than a scientific one. Although this isn't inherently wrong, it shouldn't be the only or most significant framing in the coverage.

An analysis is provided with the aim of tying together the collected data. To add more voices to the discussion, content from the water institutes of both UCT and Stellenbosch University (SU), known respectively as the Future Water Institute and SU Water institute, will also be used in the assessment, as well as COCT press releases concerning the water crisis/drought. UCT and SU were rated number one and four respectively on the 2018 QS University Rankings for South Africa: "First launched in 2013, the QS University Rankings: BRICS showcases the best performing universities in the five BRICS countries (Brazil, Russia, India, China and South Africa)," (Top Universities, 2016). A total of twelve top universities from South Africa were included in the 2018 rankings. Lastly, a conclusion is provided summing up the overall findings of the study with recommendations for future research.

Chapter 5 – Coverage of the water crisis (quantitative analysis)

Despite fear that Cape Town could become the "first major city in the world to run out of water" (Mulligan, 2018), print news media coverage of the water crisis didn't seem to represent the same pressing concern. Out of the three print newspapers surveyed for this study, there was a total of 226 documented front-page stories concerning the drought during the time period 1 January 2017 to 30 April 2018 (16 months). Within this total, the *Cape Argus* had the highest number of front page stories with 39,82% (90/226), second was *Die Burger* with 31,86% (72/226) and last was the *Cape Times* with only 28,32% (64/226). In order to calculate the saliency of the water crisis on the print media agenda, the total number of articles relevant to the water crisis (including front page articles) were tallied for each edition in each month and compared with the total number of news articles. These figures were then tabulated and represented in a graph (see below Table 1 below).

5.1. Cape Argus

According to the below data, coverage concerning the water crisis was at its lowest in July 2017 and at its highest in February 2018. Although this makes sense in terms of the progression of the drought, Cape Town was still experiencing level 4B water restrictions during July 2017, where individual users were only permitted to use 87 litres of water per day with collective usage at 500 million litres per day (Payi, 2017).

Table 1: Number of articles relevant to water crisis in comparison to rest of publication

Cape Argus			
Month	Articles relevant to water crisis	Total	%
Jan-17	11	403	2,73
Feb	13	418	3,11
March	15	482	3,11
April	6	345	1,74
May	8	449	1,78
June	9	446	2,02
July	6	422	1,42
Aug	15	447	3,36
Sep	11	450	2,44
Oct	16	490	3,27
Nov	13	492	2,64
Dec	10	440	2,27
Jan-18	41	469	8,74
Feb	58	492	11,79
March	38	480	7,92
April	11	414	2,66
Total:	281	7139	3,94

For the time period of the study, a total of 281 news articles relevant to the water crisis were documented, however the total number of news articles recorded was 7159. This means that only 3,93% of news coverage was dedicated to the water crisis in 16 months, during which the height of the drought was reached.

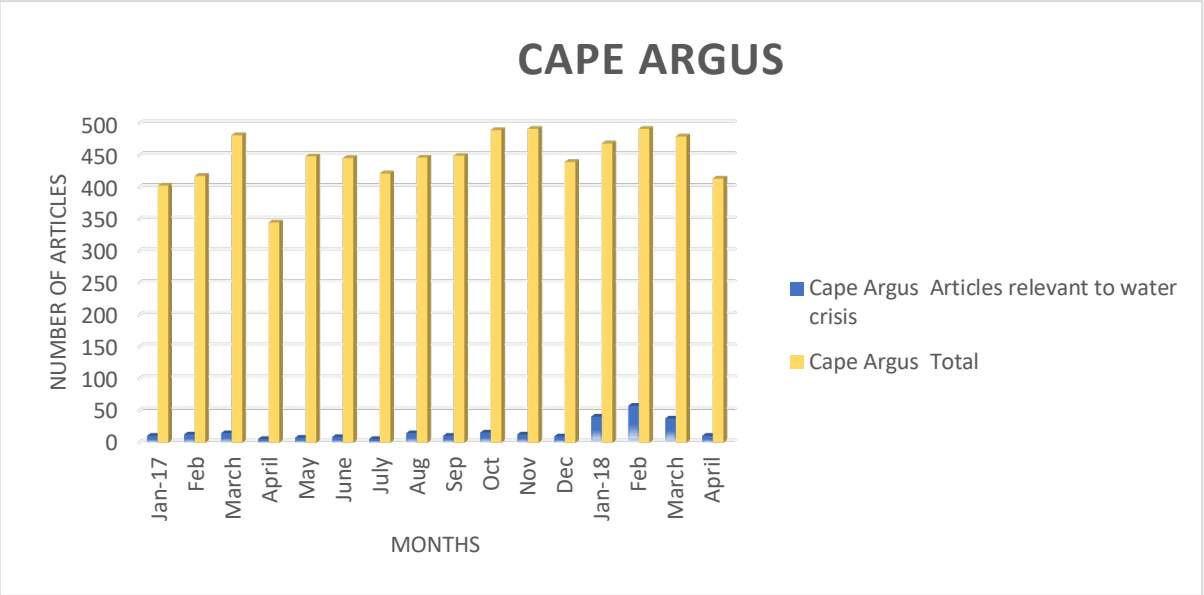

Figure 6: Graph showing number of articles relevant to water crisis in comparison with rest of publication

5.2. Die Burger

Die Burger's water crisis coverage was the lowest in September 2017 and highest in January 2018. Again, this makes sense when one considers the progression of the drought, however the COCT was gearing up to implement level 3B restrictions during this time. According to the City's mayoral committee member for informal settlements, water and waste services and energy, Councillor Xanthea Limberg, this was as a result of the "severe drought that is being experienced and the repeated failure to reach the intended water savings target of 800 million litres of collective water use per day" (ANA reporter, 2017).

Table 2: Number of articles relevant to water crisis in comparison to rest of publication

Die Burger			
Month	Articles relevant to water crisis	Total	%
Jan-17	6	458	1,31
Feb	10	491	2,04
March	14	529	2,65
April	6	418	1,44
May	7	568	1,23
June	14	633	2,21
July	8	589	1,36
Aug	12	603	1,99
Sep	7	585	1,20
Oct	10	596	1,68
Nov	15	547	2,74
Dec	16	525	3,05
Jan-18	67	614	10,91
Feb	53	536	9,89
March	27	581	4,65
April	15	535	2,80
Total:	287	8808	3,26

A total of 287 news articles relevant to the water crisis were documented, with the total number of recorded news articles for the research period being 8808. This means that only 3,26% of news coverage was dedicated to the water crisis/drought.

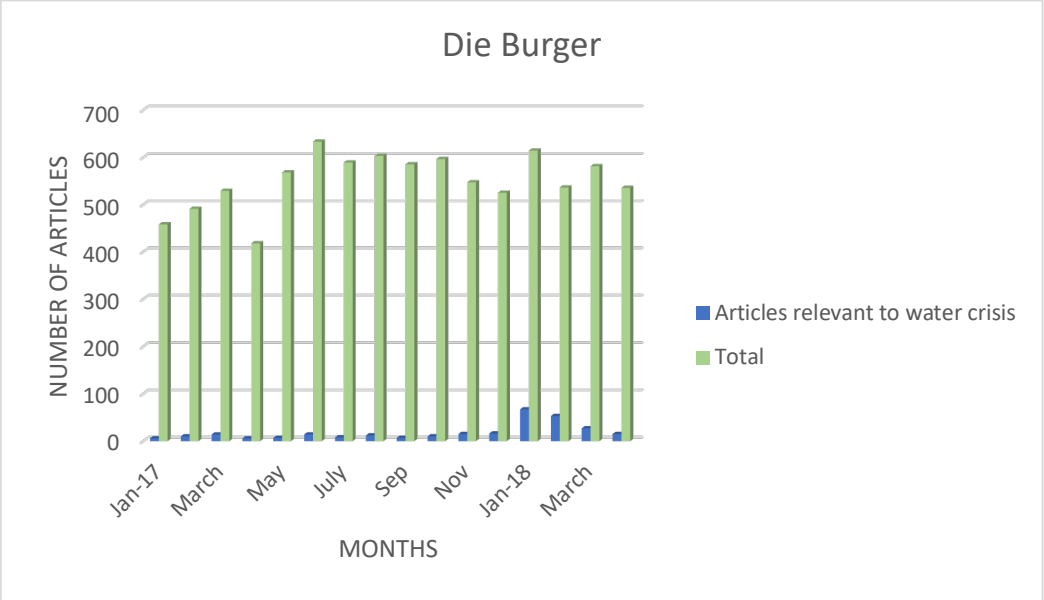

Figure 7: Graph showing articles relevant to water crisis in comparison with rest of publication

5.3. Cape Times

The *Cape Times* had the least amount of water crisis coverage out of the three print publications with only 188 relevant stories during the research period. Their worst month in terms of coverage was in

July 2017 where only two out of 493 articles were dedicated to the water crisis. As mentioned previously, Cape Town was experiencing level 4B water restrictions during this time. Their best month of drought coverage was in February 2018. The COCT implemented level 6B water restrictions on 1 February 2018, with Day Zero expected to take place in April 2018 (Thom, 2018). A total number of 6793 news articles were recorded for the research period meaning that 2,77% of articles were dedicated to the water crisis.

Table 3: Number of articles relevant to water crisis in comparison to rest of publication

Cape Times			
Month	Articles relevant to water crisis	Total	%
01-Jan	9	403	2,23
Feb	13	404	3,22
March	14	400	3,50
April	4	354	1,13
May	11	500	2,20
June	8	497	1,61
July	2	493	0,41
Aug	6	502	1,20
Sep	8	435	1,84
Oct	11	530	2,08
Nov	7	533	1,31
Dec	12	389	3,08
01-Jan-18	25	463	5,40
Feb	27	436	6,19
March	21	436	4,82
April	10	421	2,38
Total:	188	7196	2,61

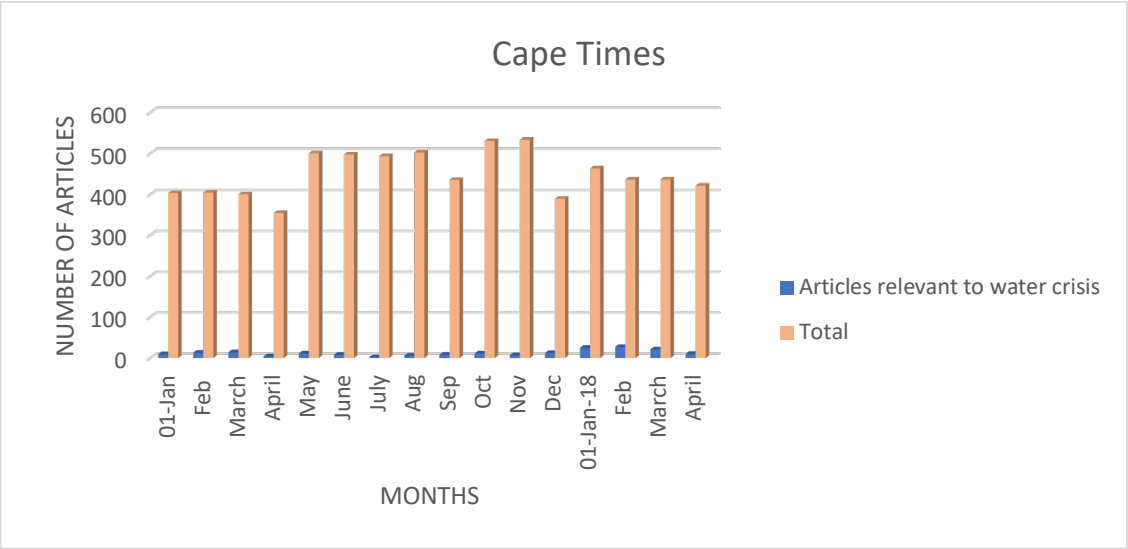

Figure 8: Graph showing number of articles relevant to water crisis in comparison to rest of publication

5.4. News24 and GroundUp

Between 1 January 2017 and 31 April 2018, News24 published 460 news articles of relevance to the water crisis within the three search categories 'water restrictions', 'drought' and 'water crisis' collectively. GroundUp published significantly less articles within the same period, with only 44 news articles published about the water crisis, however this is not surprising given the size of News24 in comparison to GroundUp. Search categories were not necessary when collecting data from GroundUp because they provide a separate webpage dedicated to the water crisis. GroundUp's drought coverage peaked in January 2018 with 10 articles and was at its lowest in February, June, July and October 2017, as well as April 2018 (see Table 4).

Table 4: Table showing drought coverage for GroundUp from January 2017 to April 2018.

GroundUp	
Month	Number of articles
Jan-17	0
February	1
March	0
April	2
May	4
June	2
July	1
August	0
September	0
October	1
November	6
December	2
Jan-18	10
February	6
March	8
April	1

Table 5: Table showing drought coverage of News24 from January 2017 to April 2018.

News24	
Month	Number of articles
17-Jan	14
February	18
March	12
April	8
May	29
June	12
July	14
August	12
September	12
October	25
November	16
December	16
18-Jan	83
February	70
March	40
April	24

It is also worth noting that there were four months where GroundUp failed to publish articles about the drought at all. News24's drought coverage peaked in January 2018 with 83 articles and was at its lowest in April 2017 (see Table 5), even though Cape Town was experiencing level 3b water restrictions which were increased to level 4 on 1 June 2017. Unlike GroundUp, News24 published articles concerning the drought every month during the time period of the study.

5.5. Conclusion

With regards to the saliency of the drought on the print media agenda, the above data clearly shows that coverage was rather minimal in comparison to the volume of other news stories published during the time period of the study. The drought coverage in both the *Cape Argus* and the *Cape Times* was at its highest in January 2018, whereas for *Die Burger*, GroundUp and News24, drought coverage was at its highest in February 2018. One would have expected more extensive drought coverage given the severity of the water crisis in Cape Town and how the city came worryingly close to reaching Day Zero.

Chapter 6 – Qualitative framing analysis

Entman and Rojecki (1993:155) identify several journalistic judgements that "filter into the news and, in turn, likely affect [a] movement's ability to build consensus and mobilise participation". These judgments arise from the process of "selecting and conveying information" (Entman & Rojecki, 1993:155) about a given movement or phenomenon. As cited by Entman and Rojecki (1993:156), the impacts of media frames on the public's perceptions of and responses to policy issues can be characterised as follows:

> The character, causes, and consequences of any phenomenon become radically different as changes are made in what is prominently displayed, what is repressed, and especially in how observations are classified. Far from being stable, the social world is… a kaleidoscope of potential realities, any of which can be readily evoked by altering the ways in which observations are framed and categorised. Because alternative categorisations win support for specific political beliefs and policies, classification schemes are central to political manoeuvre and political persuasion.

According to Entman and Rojecki (1993:156), the media are crucial for getting the word out to the mass of potential supporters and "given the logic of collective action, incentives for an individual to participate in any movement are inherently fragile, hence unfavourable media assessments can seriously weaken a group's recruitment efforts". Cape Town has been experiencing severe drought for the past several years and as a result, numerous movements have been launched by various stakeholders in an effort to improve water scarcity (such as the DA's #DefeatDayZero campaign, the DWS #SaveWater campaign and COCT's THINK WATER campaign). These movements require mass action from citizens in order to be effective. In other words:

> Media reactions… affect whether a movement will be able to spread its appeal among the citizenry [because] the news helps determine whether elites feel pressure to support the movement's policy goals, [since] positive coverage can convey that citizen sentiments are favourable and that the issue is a high public priority, (as cited by Entman & Rojecki, 1993:156).

6.1. Cape Argus

The *Cape Argus'* first front page story concerning the drought during the research period (1 January 2017 – 30 April 2018), titled 'Dam levels near critical', was published on 18 January 2017. The story leads with how dam levels "were yesterday at near-critical quantities after dropping nearly 10 percent, from 51,2 percent last month to an alarming 42,5 percent this week" (Sesant, 2017a:1). The overall story carries a negative theme with the major frames being as follows: Water consumption still too high; warning of increased water restrictions; citizens must conserve water; and consequences for high water consumers. As Sesant (2017a:1) writes: "The City of Cape Town's level 3 water restrictions appear to have done little to curb excessive water consumption and, despite billing offenders R33 million collectively, the restrictions have not worked." According to Sesant (2017a:1), Limberg claimed that the City "had no other option but to strengthen water restrictions" as a result of increased water consumption "to 890 million litres a day from the 859 million litres consumed, on average, every day last week". Limberg is the only source quoted throughout the story. The aforementioned frames form part of the most prevalent frames in the *Cape Argus'* drought coverage, appearing 16, 14, 14 and 11 times respectively (see Table 6). The next four stories published on the front page of the *Cape Argus* after 18 January 2017 appear on 20, 24, 26 and 27 January in the same year. Based on this data, the first story concerning the drought appeared over half way through January, however the next four stories appear between one and four days apart.

The story 'Water restrictions to be tightened' published on 20 January 2017 opens with a warning to citizens about increased water restrictions (appears 14 times in total front-page coverage): "Level 3b water restrictions – the highest level yet – are on the horizon as the City of Cape Town scrambles to find ways to curb excessive water use amid diminishing dam levels which, at 42,5%, are critically low," (Sesant & Hlati, 2017:1). The lead of the story also paints a picture of the City floundering as it tries to find ways to effectively manage the water crisis. Limberg is then quoted refuting reports that taps could run dry: "I can confirm that [this] will not be [the] case. If we are strained, we will, for example, be able to tap into our emergency sources," (Sesant & Hlati, 2017:1). This insinuates there is uncertainty among those managing the water crisis with regards to the severity of the drought and the resultant outcome if things were to progressively worsen. Limberg, again the only source quoted throughout the story, is later quoted stating that the City plans to crack down on the worst water wasters, aligning with the frame 'consequences for high water consumers':

Table 6: Top media frames referenced in Cape Argus front page drought coverage.

Media frame	Number of refernces in coverage
Water consumption still too high	16
DA versus ANC	15
Warning of increased water restrictions	14
Citizens must conserve water	14
Unhappiness with City's management of drought	14
Measures the City is undertaking to curtail water usage/ improve drought	13
Business security at risk due to drought	12
The drought is a serious issue	12
Consequences for high water consumers	11
Water saving burden placed residents	11

> 'So many of our residents have really gone above and beyond the call of duty to save water. They have been selfless and have been true water ambassadors for us. Sadly, this cannot be said for all our residents. We will continue to take action against these culprits and will target the City's top 20 000 high water users – the majority of whom reside in formal areas of the metro' (Sesant & Hlati, 2017:1).

Limberg then adds that citizens have the power to "turn this situation around" if collective water use is reduced – this aligns with two major frames in the study: 1) Citizens must conserve water; and 2) Water saving burden placed on residents.

Uncertainty surrounding effective management of the drought can be most clearly translated into two frames: DA versus ANC (appears 15 times) and DA versus DA. Although the former is among the top media frames identified in the *Cape Argus'* front-page coverage, the 'DA versus DA' frame appears five times throughout the publication's 2018 coverage in stories published on 17 January, 25 January, 9 March, 18 April and 23 April. According to Felix and May (2018:1), in the story 'Water war spills into the streets' published on 17 January:

> Mayor Patricia de Lille is already facing an avalanche of resistance from residents over her proposal for a water levy and is fighting resistance in her own party over it. Apart from the water battles, she also faces an investigation by the DA on issues of corruption and her

> leadership style. The DA has decided to relieve her of the management of the water [crisis] to focus on other issues of her job as mayor.

Felix and May (2018:1) highlight how there is conflict within the DA, suggesting that they are unable to trust their own party officials or agree on the best course of action for drought fund management. The overall theme of this story paints a negative picture of the current state of affairs within the COCT with regards to the drought. The story also touches on public outcry in response De Lille's proposal of a citizen drought levy in order to make up for the City's revenue deficit:

> De Lille's proposal to introduce a 'drought levy' based on property prices was met with fury from thousands of residents… The drought charge is needed to make up the deficit in the City's revenue, which has come about due to residents' water savings and thus paying significantly less for water and sanitation (Felix & May, 2018:1).

The City is in effect penalising citizens for saving water as instructed to do so for months by the City itself. Felix and May (2018:1) then add how De Lille's "own party made a U-turn after the massive outcry, with the City receiving more than 55 000 complaints", again highlighting the internal conflict frame of 'DA versus DA'. Anton Bredell, DA provincial chairperson and Western Cape Member of the Executive Council (MEC) for Local Government (documented 12 times in total front-page coverage, see Table 7), is also quoted stating that "it would be unfair to add a water levy with most residents already bearing the brunt of the country's economic state. We simply cannot expect them to pay more" (Felix & May, 2018:1).

Table 7: Top quoted sources in Cape Argus front page drought coverage.

Name	Title	Number of references in coverage
Xanthea Limberg	Mayoral Committee member for informal settlements, water and waste services and energy	27
Patricia de Lille	Mayor of Cape Town	21
Anton Bredell	Local government Member of the Executive Council	12
Ian Neilson	Cape Town deputy mayor	5
Alan Winde	Economic Opportunities Member of the Executive Council	5

It is also worth taking note of the emotive language used in describing the current atmosphere in Cape Town: "As the city edges closer to Day Zero – with 95 days of water left – residents are queuing at springs and causing conflict with other residents. Those living close to the Newlands spring have complained of hooting and screams of frustration that fill the air when people collect their water" (Felix & May, 2018:1). As outlined in the Code of ethics and conduct for South African print and online media, it is within a journalist's job scope "to report news truthfully, accurately and fairly" (Press Council, 2016). This includes, among other clauses, that "news shall be presented in context and in a balanced manner, without any intentional or negligent departure from facts whether by distortion, exaggeration or misinterpretation, material omissions, or summarisation" (Press Code, 2016), as well as "only what may reasonably be true, having regard to the sources of news, may be presented as fact, and such facts shall be published fairly with reasonable regard to context and importance… Where a report is not based on facts or is foundered on opinion, allegation, rumour or supposition, it shall be presented in such manner as to indicate this clearly" (Press Code, 2016). One can argue that the use of emotive language by Felix and May (2018:1), not in the context of a direct quote from a source/s, goes against the aforementioned clauses of the press code.

The conflict frame 'ANC versus DA' is the second most prevalent frame throughout the *Cape Argus'* drought coverage appearing 15 times. In 'R6bn for drought relief 'not enough' (23/02/18), Zille claims that the government's R6 billion investment towards drought relief and water augmentation schemes is "insufficient" because it is split between all drought-stricken provinces in the country, adding that "no local government should have to shoulder the burden of capital and operational costs for what is a national function" (Felix, 2018a:1). According to Zille, as quoted by Felix (2018a:1):

> 'Although R6bn is a lot of money, divided between five provinces it will hardly touch sides if it is intended for both relief and new infrastructure. The City's infrastructure-build programme, on its own, amounts to almost R6bn… Although bulk water supply is its mandate, the national Department of Water and Sanitation has not made funding available for augmentation in this crisis, because the National Treasury has literally turned off their funding tap following a disastrous audit outcome. As a result, the City of Cape Town has stepped into the breach with aquifer extraction, water reuse and desalination projects to the tune of some R5,9bn over the 5-year medium-term revenue expenditure framework.'

Zille implies that DWS has not been doing their part to help the COCT address water scarcity effectively. Zille then adds that the provincial economy has remained resilient despite the drought and other natural disasters: "A total of 598 000 new jobs were added in the Western Cape since the fourth quarter of 2009, the year we took office. The province has also again recorded the lowest official unemployment rate, which now stands at 19,5%, against a national rate of 26,7%" (Felix, 2018a:1). This statement contradicts claims made in other stories published in the *Cape Argus* where business and job security is deemed at risk due to the drought (these frames appear 12 and four times respectively throughout total front-page coverage). This statement is also aligned with the 'DA versus ANC' conflict frame as Zille pits performance in the provincial economy against that in the national economy. Towards the end of the article, Felix (2018a:1) quotes Pierre Uys, ANC chief whip, in reaction to Zille. According to Uys, the ANC would have wanted to hear Zille speak on how the province would latch on to the national development plan, adding that "instead we heard of all the clean audits, which basically means nothing for the man on the street" (Felix, 2018a:1).

The story 'Just like our dams, the department's funds dried up' (28/02/18) leads with how DWS is bankrupt and has a R2,9 billion over-draft: "Now Parliament's watchdog on public accounts plans to lodge criminal complaints against the department because it is failing to account for millions of rands," (Felix, 2018b:1). Given the fact that the City tried to implement a 'drought levy' ('Water war spills into the streets', published 17/01/18) due to a lack of funds at the expense of the public, if money that could be used to assist the City's water crisis is being pocketed by government officials, it seems even less likely that citizens will support water tariff hikes and additional levies. This negatively impacts everyone since water is a collective asset and everyone would have to bear the brunt if the City had in fact reached Day Zero. The 'DA versus ANC' conflict frame is also present in this story: "Premier Helen Zille said financial mismanagement within the department (national) has had a severe impact on water security and the delivery of bulk water infrastructure in the province and elsewhere in the country," (Felix, 2018b:1).

Cape Argus drought coverage peaked in February 2018 with 58 published articles of relevance to the water crisis. Of this 58, there were only 10 front page articles: 1) 'Level 6b water restrictions in effect' (01/02/18); 2) 'How the rich are dealing with the water crisis' (02/02/18); 3) 'What level 6 restrictions mean in practice' (02/02/18); 4) 'Tourists spooked by water crisis' (05/02/18); 5) 'Heavy price as Day Zero delayed' (06/02/18); 6) 'Government takes charge of water crisis' (09/02/18); 7) 'Cape sport takes a knock due to drought' (21/02/18); 8) 'R6bn allocated for water relief' (22/02/18); 9) 'R6bn for drought relief 'not enough'' (23/02/18); and 10) 'Just like our dams, the department's

funds dried up' (28/02/18). 'How the rich are dealing with the water crisis' leads with water saving measures residents are implementing in the wealthier parts of the City: "Artificial grass, water tanks and buying non-potable water for their swimming pools are just some of the [ways] residents in the more affluent parts of Cape Town are dealing with the water crisis," (Tswanya, 2018:1). Tswanya (2018:1) quotes Byron Herbert from the Camps Bay, Clifton Ratepayers Association:

> People in the area [are] spending lots of money and going above and beyond to save water, and anyone who [thinks] otherwise is ignorant and buying into the City's propaganda. Sure, there will be people that are blasé about it but I doubt that residents of Camps Bay and Clifton consider it business as usual. This is water so no matter how much money you have, if taps run dry, they run dry… If you drive around, you will see water tankers and people pumping water. Everyone is doing what they can and fortunately the wealthy can afford to do what they can… When we speak to our staff room from poorer communities, they don't appear to understand the urgency of saving water and that is where one needs to speak to people in a narrative that they will understand – not a language they understand, but a narrative.

The overall theme of this story is positive, despite Herbert's accusatory comments about citizens from poorer communities, detailing how different initiatives are being taken in order to save water. Herbert also makes a good point about the outcome if Cape Town runs out of water – no matter one's wealth, the taps running dry will affect everyone the same.

In the story 'Heavy price as Day Zero delayed', Felix and Mkentane (2018:1) lead with how consumers should still preserve water "as well as prepare for higher food prices as the water supply to farmers has been curtailed" despite Day Zero being pushed back by four weeks. The story continues: "Many of the agricultural users in the Western Cape Supply System, where the City also draws its water from, have used up the water allocated to them as per agreement with the national Department of Water and Sanitation… It is therefore expected that less water will be used in the agricultural sector in the coming weeks," (Felix & Mkentane, 2018:1). Felix and Mkentane (2018:1) quote Agri Western Cape, drawing attention to how less water in the agricultural sector will affect consumers:

> Agriculture's water supply has been curtailed by between 60% and 87%. In the Lower-Berg River region, producers' water quota has been depleted. No water is available for the after-crop irrigation of orchards and vineyards. This will have an effect on next year's harvest. This puts pressure on the socio-economic and economic well-being of rural areas and the value chain.

Focus is then shifted to the state of the economy with John Ashbourne, Africa economist at Capital Economics, explaining how the worsening drought would not be enough to "snuff out" South Africa's economic recovery:

> From a purely economic perspective, however, we think the impacts of this year's drought on headline GDP growth will be relatively modest. The effect will be limited to the Western Cape (which makes up about 15% of national GDP) and will mostly hit two key industries, agriculture and tourism, (Felix & Mkentane, 2018:1).

This is the only occasion where Ashbourne is quoted. The aforementioned story only contains three of the 10 major frames present in the *Cape Argus'* front-page drought coverage: 'Water consumption must be reduced/citizens must conserve water'; 'the drought is a serious issue' – "Despite the devastating drought wreaking havoc across the Western Cape… the possibility that the City of Cape Town might cut off all running water in May, would be a humanitarian crisis posing 'serious risks to public health'" (Felix & Mkentane, 2018:1); and 'water saving burden placed on residents'. In this case the latter also includes citizens having to shoulder the burden of the drought (i.e. increased food prices).

In 'Government takes charge of water crisis', Felix (2018c:1) opens with how government plans to prevent a national water shortage: "In a bid to prevent a national water shortage, the government is planning to declare the water crisis a national disaster by the end of the week and are considering plans to nationalise private dams." By declaring the drought a national disaster, responsibility is legally assigned "to the national executive to co-ordinate the disaster, while a declaration is being considered to be finalised within a period of a month" (Felix, 2018c:1). According to Des van Rooyen, Minister of Co-operative Governance and Traditional Affairs, the drought was having a "profound negative impact" on the economies of provinces affected and

"Government can therefore not sit idle while the situation deteriorates" (Felix, 2018c:1). Nomvula Mokonyane, Minister of Water and Sanitation, is also quoted in the story asking political parties to refrain from communicating their own messages about the water crisis:

> 'We have a national minister of water and sanitation. We have a minister of agriculture and a minister of co-operative governance. We are the leader in this crisis together with the MECs and mayors from affected municipalities and provincial governments' (Felix, 2018c:1).

Felix (2018c:1) claims that "Mokonyane was indirectly referring to DA leader Mmusi Maimane who had taken over the communications role on the water crisis in Cape Town". However, no direct quote from Mokonyane with Maimane's name is included in the story to verify this statement. This lends itself to the prevalent 'DA versus ANC' conflict narrative present in the *Cape Argus'* front page drought coverage.

'Cape sport takes a knock due to drought' was published towards the end of February 2018 and deals with how the drought negatively impacts sport in the province: "The water crisis has hit the sport industry in the Western Cape with the South African Football Association (Safa) saying the drought has affected them adversely," (Charles, 2018:1). This is arguably a null and void statement since everyone in the province has been adversely affected by the drought. Safa CT president Bennett Bailey adds that the organisation is not able to cancel matches or further reduce its water consumption: "We have made sacrifices and to be honest with you, it doesn't look like the City has a plan in place," (Charles, 2018:1). The overall theme in this story is negative and Bailey casts a shadow of doubt over the City's abilities to effectively manage the drought. If one looks at the aforementioned story, one can also argue that sport is a rather inconsequential aspect of the water crisis given the fact that during this time Cape Town was experiencing 6b water restrictions and uncertainty around when and if Day Zero would occur at all.

Only four environmental experts were mentioned in all of the *Cape Argus'* front-page drought coverage, all of which occurred in 2017 over a period of 6 months. The first reference was UCT professor Kevin Winter in a story titled 'Water drill risks poisoning the walls' (24/03/17). Winter explains that the drilling of boreholes into aquifers on Table Mountain and on the Philippi Horticultural Area (PHA) could have a disastrous impact on the environment:

> 'Tall trees would start withering, dying and falling over, as well as lakes and rivers ceasing to flow are the first signs of the over-

> abstraction of groundwater. Domestic gardens would be abandoned and become increasingly covered by hardened surfaces resulting in elevated urban temperatures. Levels of dust particles rise and so do lower levels of atmospheric temperature. With an increase of contaminants in confined bodies of water, surface water quality deteriorates' (Sesant, 2017b:1).

The second environmental expert quoted was Dr Nicholas King, however it is not specified what kind of environmental expert he is or for what university/organisation he works for. In the story titled 'Water: 'City not doing enough'' (01/08/17), King states that the days of swimming pools and large lawns are gone: "Investment needs to go into desalination and extracting ground water. Humans cannot live without water and we will have to start looking at trucking-in water from other areas," (Philander & Dano, 2017:1). The next quoted expert was Kumi Naidoo, former director of Greenpeace, in the story 'Water: emergency plan unveiled' (18/08/17). According to Naidoo, as quoted by Philander (2017:1):

> 'There [is] no doubt that what the climate scientists warned us about, has had a major impact on water security for people in the Western Cape. With water supply at a precious level, we can only hope that political leaders will get serious about planning South Africa's long-term water security. Water and soil quality are critical for food security and also for the economy given that agricultural produce is a key export that supports the Western Cape economy. If water supply drops, tough choices will need to be made between water for economic activity and for water consumption.'

The final environmental expert quoted was Ray de Vries, Chief executive of South African company AIRWATER. De Vries voiced his concerns regarding the new level 5 water restrictions: "This new water restriction is long overdue and I think we should've woken up much earlier," (Charles, 2017:1). In concluding this section, it is again important to note that the majority of sources quoted in the *Cape Argus'* front-page drought coverage were government officials.

6.2. Die Burger

The first front page story concerning the drought/water crisis in *Die Burger* was titled 'Dams now under 40%' and published on 24 January 2017. The major frames in this story centred around how "dam levels in the Western Cape dropped to 40% for the first time in years" and how this will lead to "stronger water restrictions probably [coming] into effect from 1 February" (Barnard, 2017a:1). Barnard (2017a:1) then quotes Limberg who explains that by mid-April, only 20% of water would remain in the dams if the average daily decline of 0,23% continues". Limberg adds: "If the inhabitants of Cape Town and the neighbouring towns, as well as the agricultural sector, stay within the water restrictions, there will be enough water in the dams until the beginning of the winter rainy season," (Barnard, 2017a:1). Limberg also states that the Cape Town Council "targets and fines the 20 000 largest water users, all of whom stay in formal urban areas of Cape Town" (Barnard, 2017a:1). The latter aligns with the frame 'consequences for high consumers' which is documented seven times throughout *Die Burger's* front-page drought coverage. Limberg is one of the top sources quoted in *Die Burger*, appearing 10 times in total (see Table 8 below). The aforementioned story also claims that "the City Council has denied rumours that there is only 100 days of water left" (Barnard, 2017a). The next four stories published on the front page of *Die Burger* after 24 January 2017 appear on 25 January, 14 February, 2 March and 6 March. Based on this data, just like in the *Cape Argus*, the first front page story concerning the drought appeared well over half way through January with the next four stories being between one and 20 days apart. This is arguably the worst coverage in terms of volume within the first month of drought coverage. In 'Cape has 110 days of water left' (14/02/17), Barnard and De Lille (2017a:1) lead with how the Cape Town Council have revealed the "shocking news" that "only four months of water is left" in the City. This directly contradicts claims made just 20 days earlier, also by the City Council, where they denied that there was only 100 days of water left. This sends mixed messages to readers and again brings into question the severity of the drought as well as the competence of those in charge of managing it. According to Barnard and De Lille (2017a:1):

> Engineers warned last week that the target of 800 million litres of water per day had to be reached two months ago, but [this has] not been achieved week after week. If Capetonians can manage water consumption to 700 million litres of water a day, there is still 135 days left for drinking water. If the savings are not reached, there is only 110 days of water left.

Table 8: Top quoted sources in Die Burger front page drought coverage.

Name	Title	Number of references in coverage
Patricia De Lille	Mayor of Cape Town	14
Xanthea Limberg	Mayoral Committee member for informal settlements, water and waste services and energy	10
Ian Neilson	Cape Town deputy mayor	4
Anton Bredell	Local government Member of the Executive Council	4
Helen Zille	Western Cape premier	3
Mmusi Maimane	Democratic Alliance leader	3
James-Brent Styan	Spokesperson for Anton Bredell	3
Zara Nicholson	Spokesperson for Patricia De Lille	2
Nomvula Mokonyane	Minister of Department of Water and Sanitation	2
Des van Rooyen	Minister of Co-operative governance and traditional affairs	2

However, the City Council's denial of being close to the 100 day mark of usable water occurred within these two months, creating two possible explanations: 1) The City Council was unaware that the collective 800 million litre per day mark was consistently being missed thus bringing the City where it is now – this explanation is worrisome since one would expect that during a water crisis the City would be keeping track of just how much water is being used; or 2) The City Council was well aware of the fact that Capetonians were over stretching water resources and deliberately misled the public into thinking that the situation wasn't as bad as it was. Towards the end of the story, Barnard and De Lille (2017a:1) explain that due to level 3b water limitations, "gardens may only be watered with municipal drinking water on Tuesdays and Saturdays – for a maximum of one hour a day". One can argue that watering the garden seems rather superfluous since readers were a few lines earlier warned that if they don't do more to save municipal drinking water then "there is only 110 days of water left" (Barnard & De Lille, 2017a:1). This creates confusion and again casts a shadow of doubt over how severe the drought is; severe enough that if people don't significantly change their lifestyles, Cape Town will run out of water, but not so severe that citizens should have to deal with the burden of brown grass? Using non-potable water for replenishing gardens isn't even suggested to readers as an idea which also seems strange. Limberg is quoted again in this article claiming that the Western Cape water supply system has a 97% to 98% assurance of sufficient water: "[This means that] every century there will not be enough water for two to three years," (Barnard & De Lille, 2017a:1).

There are multiple frames present in the aforementioned story, namely: Drought is a serious issue; citizens must conserve water; warning of increased water restrictions; dam levels decrease; and mixed messages regarding the drought. Each of these frames appear 21, 15, 12, 11 and eight times respectively (see Table 9 below).

Table 9: Top media frames in Die Burger front page drought coverage.

Media frame	Number of references in coverage
Drought is a serious issue	21
Measures the City is undertaking to curtail water usage/ improve drought conditions	20
Water consumption still too high	15
Citizens must conserve water	15
Warning of increased water restrictions	12
Water saving burden placed on residents	11
Dam levels decrease	11
Unhappiness with drought management	8
Mixed messages regarding the drought	8
Consequences for high consumers	7
Dam levels increase	7

The most prevalent frame in *Die Burger's* coverage is how the drought is a serious issue. Since this frame appears in over 20 stories, a sample of every second article starting with the first one by date was taken in order to provide an analysis. The first story to contain this frame is coincidentally 'Cape has 110 days of water left' (14/02/17). The next story in the sample is titled 'Only 100 days of water left in Cape Town' and was published on 4 April 2017. The story leads with how dam levels in Cape Town "have now dropped to 26,2% and the [City] Council is working on plans to replenish the supply of drinking water to more than 500 million inhabitants" (Felix, 2017:1). Limberg is then quoted giving water consumption figures: "Water consumption in the past week was 741 million litres per day – 41 million litres more than the 700 million litre target we would like to achieve," (Felix, 2017:1). This aligns with the frame that water consumption is still too high. In the story 'Dam level rises slightly due to rain' (13/06/17), Bredell's spokesperson, James-Brent Styan, explains that although a week of storms and good rain caused dam levels to rise, "there is still a drought and the province is still a disaster… We need a lot of rain and the dam levels will have to rise at least to 70% by October to be ready for next summer" (Nienaber, 2017a:1). Limberg adds that due to the unpredictability of climatic conditions, there is no guarantee of how much it will rain in winter and it will require subsequent seasons of normal rainfall for the dam levels to recover: "People are warned not to use more water now that it rained. The daily limit [must remain] 100 litres of water per person per day," (Nienaber, 2017a:1). 'Plan for permanent drought' published on 3 July 2017 opens by alerting readers to how serious the drought is:

> Stronger water restrictions have been in effect in Cape Town since Saturday, while the City Council is now preparing for a 'permanent drought'. Patricia de Lille, mayor of Cape Town, says the Cape has had

> so far only 5% of the average winter rainfall this year and 'it has made almost no difference'. Despite the reassuring effects of recent rains, there is still a disastrous drought, (Barnard & De Lille, 2017b:1).

De Lille adds: "The City of Cape Town has a 30-year plan to manage water, but the scale of the disaster is so drastic that tightened emergency plans need to be put in place to deal with the crisis… 2016 was the hottest year on record, we cannot rely on further rain to bring relief and get us through the summer months," (Barnard & De Lille, 2017b:1).

On 8 August 2017 *Die Burger* published 'Little more water in Western Cape dams after recent rain' where Barnard (2017b:1) explains that despite the previous week's rain slightly increasing dams in the Western Cape, "the latest 28,1% average [dam level] is not even half of last year's 68% in the corresponding period". In 'Cape Town receives R75m in drought aid', readers are told that national government has allocated R74,8 million in drought aid to the Western Cape. According to Styan, the province is "very grateful for the money… It's already going a long way but we need much more help, however, what little help we get is welcome and appreciated" (Essop, 2017:1). Essop (2017:1) adds: "Strict water constraints apply in the province... The extent and severity of the drought has already led to the Western Cape government declaring the province a disaster area."

'War over water threatens the Cape', published 12 October 2017, quotes Dr Roger Parsons, a hydrogeologist with more than 30 years of experience and chairman of the WC branch of the Soil Division of the Geological Society of South Africa, stating that "the situation (drought) is critical and the inhabitants of Cape Town are now entering a survival battle" (Barnard, 2017c:1). Parsons then predicts that things could get so bad that a "water war" could ensnare the COCT:

> If Cape Town's water plans do not work, a future image is sketched of army soldiers that protect water points while distributing each person's quota… Such misery can be a reality within the Cape Metropolitan area within six months if the City's plans for additional groundwater and desalination are not carried out in time and residents do not save enough water, (Barnard, 2017c:1).

Parsons also criticises DWS for being "completely absent in the efforts to save the water crisis" (Barnard, 2017c:1). On 7 November 2017, *Die Burger* published another story detailing how dam

levels in the WC dropped despite recent rain. Mokonyane, is then quoted from a media conference: "South Africa needs R40 billion to catch the backlog in its water infrastructure… The private sector is therefore invited to invest in both the overtaking of the backlog and the upgrading of the water infrastructure," (Nienaber, 2017b:1). This was an unlikely request, not only because it is the constitutional responsibility of local, provincial and national government to provide access to water for all, but because just three months later it was reported that DWS "suffered a complete collapse under Mokonyane" (Engineering News, 2018). According to the Standing Committee on Public Accounts (Scopa), the water and sanitation department "has a long history of instability and financial mismanagement, and Scopa has resolved to open a criminal case against the department (DWS) because of the R2.9 billion-overdraft [it] took with the [South African] Reserve Bank" (Engineering News, 2018). Furthermore, in November 2017, the Organisation Undoing Tax Abuse (Outa) took legal action against DWS due to the delay of a major water project in Lesotho, which Outa put down to "instances of serious maladministration" (Engineering News, 2018). It was also reported by News24 that, according to Outa, "Mokonyane tried to ensure that her preferred service providers [received their share] of the R25-billion [Lesotho Highland Water Project Phase Two (LHWP II)]" (Engineering News, 2018). Mokonyane also fuels the blame game by creating conflict between citizens: "The Western Cape water shortage is not due to the water consumption of people in Nyanga and Khayelitsha, but due to people living in Bishopscourt where the gardens are still irrigated," (Nienaber, 2017b:1). Although this statement isn't false per se, since the largest users of municipal water are residential areas and not informal settlements, pointing fingers and creating divisions isn't going to help solve the water crisis; it just spreads negativity and indifference. Ironically, in the same breath Mokonyane says "water should never be politicised because it could give rise to major crises and instability" (Nienaber, 2017b:1).

'Day Zero: Another shock to Cape Town' (19/01/18), is the ninth story in the sample of articles with the frame 'drought is a serious issue'. Here, De Lille is quoted stating that Day Zero is a reality: "This is happening and there is no turning back," (Barnard, 2018a:1). Barnard (2018a:1) also quotes Limberg commenting on De Lille's proposed drought levy:

> She (Limberg) says it is unlikely that the council will launch the proposed drought tax… About 60 000 people participated in the public participation process and strongly opposed the drought tax. She says the public opposition to the proposed drought tax is a 'hard lesson' for the metro council. Budgets from other projects will now be cut sharply and certain projects will also be deleted.

Limberg's comments regarding the drought levy also encapsulates how the water saving burden has been placed on residents (documented 11 times in total front-page coverage) since the City must consider a new proposal due to the rejection of the drought levy, "namely that the price of water should be increased sharply" (Barnard, 2018a:1). The last two stories in the sample are 'Mmusi: 'Cyril, grab it now!'' (30/01/18) and 'Police also watch over water' (23/04/18). In the former story, the DA, in a letter written by Maimane, officially requested that (now) President Cyril Ramaphosa intervene in the Cape Town water crisis, asking for an urgent meeting to tackle the drought. According to Prince and Theron (2018:1), this request "follows after Ramaphosa told CNN and the BBC in Davos, Switzerland, that the four-million inhabitants of the Cape Town metro were faced with an 'overall disaster' and that he would set up a team on his return to handle the crisis". In the latter article, Meyer (2018:1) explains how "millions of litres of water" that was diverted from the Berg River Dam and intended to arrive at the Misverstand Dam on the West Coast "under one of the worst droughts for decades", was "allegedly pumped to illegal storage dams in the agricultural area" via the use of sandbags and cement bellows. This led to law enforcement having to patrol the river: "The Drakenstein municipality has confirmed that law enforcement officers involved in patrolling along the Berg River have obtained temporary blue scorpion status to perform this task, empowering them to enter farms and remove illegal equipment if and where necessary," (Meyer, 2018:1).

Die Burger's drought coverage peaked in January 2018, with 67 article of relevance to the water crisis being published, however, of this number there were only 10 front page articles that referenced the drought (in other words, only 15% of January's drought coverage were front-page stories), namely: 1) 'New year brings rain and water restrictions to Cape Town' (02/01/18); 2) 'This is what the Cape's new water plan looks like' (10/01/18); 3) 'Day Zero: Another shock to Cape Town' (19/01/18) – mentioned previously; 4) 'Day Zero 'is now even closer'' (23/01/18); 5) 'Politicians fight while taps become empty' (24/01/18); 6) 'Mmusi chops City's water plans' (25/01/18); 7) 'Is it now 'Day Zero' for De Lille?' (26/01/18); 8) 'Minister does not buy into Day Zero' (29/01/8); 9) 'Mmusi: 'Cyril, grab it now!' (30/01/18) – mentioned previously; and 10) 'Cape Town can defeat Day Zero, says Maimane' (31/01/18).

In 'New year brings rain and water restrictions to Cape Town', Kruger (2018:1) explains that even though 10mm of rain was recorded in "drought-stricken areas such as Knysna and elsewhere in the Western Cape", level 6 water constraints came into force in Cape Town yesterday. 'This is what the Cape's new water plan looks like' breaks down the City's new water plan after it found that there are greater groundwater stores than initially expected:

> Over the past month, the city council reviewed the initial program to provide additional water. The main change is that groundwater is being emphasised more, and more money will be ploughed into it. Suitable sites have been identified to extract more water from the three major aquifers, and drilling equipment will be taken to the Cape Flats Aquifer this week, (Nienaber, 2018b:1).

Nienaber (2018b:1) also mentions the City's proposed drought levy, where De Lille argues that money is needed to pay for and maintain new water augmentation schemes:

> The levy is 'vital' for efforts to overcome the drought and 'protect the most vulnerable inhabitants'… A total of 464 216 out of 707 814 households will be affected by the levy and only 52 510 will pay more than R150 per month. Most residents will pay less than R47 per month.

Pending approval from the Finance Minister Malusi Gigaba (which didn't happen) the drought tax was expected to start on 1 February and would "be calculated at around 10% of the property tax on residential properties of more than R400 000 and commercial property worth more than R50 000" (Nienaber, 2018b:1). However, as stated previously, a public participation campaign was launched to see if citizens agreed with De Lille's proposal, which ended in 60 000 people strongly opposing the levy. The reason for this being that the levy is unfair to those consumers actually doing their part to save water:

> On the face of it, the monthly charge doesn't seem excessive. After all, the city does need extra major water infrastructure, as well as ongoing funding for basic services like sanitation. But the drought levy is unfair because it's based on property values and not on water use. After all, a person in a R2m home may use less water than a person residing in a R400,000 home – yet has to fork out more for the drought levy. So, instead of serving as a consumption charge like normal rates, the drought levy is, in fact, a punitive tax - something that is severe and people will struggle to pay, (Steenkamp, 2018).

Furthermore, many Capetonians have incurred huge costs: "[Citizens have installed] water efficient devices, greywater solutions and rainwater harvesting tanks – all at their own expense. No tax savings or rebates were offered by the city. These water saving items could also increase the value of the property, possibly making the levy higher," (Steenkamp, 2018).

In 'Day Zero 'is now even closer'', Nienaber and De Wee (2018:1) lead with how Zille announced that she wrote to (former) President Jacob Zuma about declaring the Western Cape a national disaster so "all levels of government can work together to prepare for water shortages and try to prevent them". Zille continues: "When the mayor of Cape Town said that Day Zero is now inevitable, it has turned to provincial government to fully run the water crisis and that is why we are here," (Nienaber and De Wee, 2018:1). Nienaber and De Wee (2018:1) then quote a climate expert who said that "national government had dismissed calls for drought aid by the Western Cape government in 2015 because 'the dams were still full' despite warnings as far back as 2007 that there will be a drought". However, Zille said the crisis of a big city without water was unprecedented and there were no other examples to consult. This creates a he said/she said conflict frame that is confusing and frustrating in a situation where people are looking for answers and assurance. The aforementioned climate expert was Dr David Olivier from the Global Change Institution of the University of the Witwatersrand (Wits) who published an analysis claiming that the provincial government in the Western Cape asked for R35 million from national government in 2015 to sink boreholes and recover water but the request was rejected "probably because the dams were still 75% full" (Brits, 2018:4). According to Olivier, as cited by Brits (2018:4), DWS was warned in 2007 that Cape Town will experience water problems by 2015, but "did nothing to reduce the use of water from dams for agriculture, and too much was awarded to farms in 2015 and 2016".

Brits (2018:4) then quotes water expert Dr Anthony Turton who was suspended by the Council for Scientific and Industrial Research (CSIR) almost 10 years ago for stating that the water quality of the country leaves much to be desired: "The current water crisis has been [perpetuated] by the country's 824 broken and overloaded sewage plants that dump 4 billion litres of sewage daily in the country's dams and rivers." Moreover, in June 2017 the GrahamTrek company submitted a white paper to the Cape Town metro to help with the City's water shortage: "GrahamTrek could [initially] provide 100 million litres of desalinated water and eventually 450 million litres a day – almost two thirds of the City's needs. The metro did not accept it," (Brits, 2018:4).

On 24 January 2018, *Die Burger* published 'Politicians fight while taps become empty', in which the uncertainty surrounding De Lille and her position in the DA is explored. According to Barnard (2018b:1):

> In the midst of the water crisis – the biggest crisis so far in the existence of the Cape Town metro council – it is unclear what mayor Patricia de Lille will do. And while the political hourglass runs out, the water taps are also empty. After De Lille was stripped of power by her fellow DA councillors, the council's legal department is now examining the legitimacy of cutting her decision-making powers.

De Lille then comments that "if the delegation system should be adjusted, the correct process has to be followed and because this was not done, it can be reviewed" (Barnard, 2018b:1).

In 'Mmusi chops City's water plans', Maimane announces that he has personally taken over control of some of the party's attempts to avoid a disaster, stating that "there is one last chance" (Barnard, 2018c:1). According to Barnard (2018c:1), Maimane said he was aware of the dissatisfaction and concern around how the DA-controlled Cape Town metro council has reacted to the crisis so far, including the way in which the drought was communicated: "Opacity is not what people expect of any DA government." Maimane then provides information on the new team he appointed to deal with managing the water crisis, namely: Zille, Deputy Mayor Ian Neilson, Limberg, Bredell and Bonginkosi Madikizela, MEC for human settlements and provincial DA leader. He also emphasised that it is national government's duty to provide water to municipalities: "Local governments simply do not have the money or mandate to supply water in bulk," (Barnard, 2018c:1). Barnard (2018c:1) then states that the Cape Town metro council and WC government are considering legal action to force national government "to do something". In response, Mokonyane said that Maimane and Zille were trying to blame national government for managing the water crisis poorly, adding that "the levels of the six dams in the Cape Town water scheme dropped a worrying 1,43% last week, placing them at only 26,94% full" (Barnard, 2018c:1). This also aligns with the frame 'DA versus ANC' (recorded six times in total front-page drought coverage).

De Lille is then brought to the forefront again in 'Is it now Day Zero for De Lille'. Here, Prince and Barnard (2018:1) explain how in Cape Town "the local political crisis rages on in the DA, and Patricia de Lille may face her own Day Zero on 31 January". This comes as a result of the majority of DA council members (84 out of 154) voting in favour of a motion of no confidence against De Lille. 'Minister does not buy into Day Zero' deals with how Mokonyane, whilst addressing the Cape Town Press Club, demanded to know "who announced that taps will dry up in Cape Town on 12 April and that the so-called Day Zero will arrive?" (Küsel & Prince, 2018:1). According to Küsel & Prince (2018:1), Zille was also present in the audience when Capetonians asked Mokonyane what is

being done to avoid Day Zero. Mokonyane answered by stating that national government has never announced any Day Zero for Cape Town, but "there are plans and Day Zero can be prevented by collaborating and looking at political and racial perspectives to overcome the crisis" (Küsel & Prince, 2018:1). However, a few sentences later, Mokonyane is quoted saying that government should not politicise the water crisis. She adds that there is no emergency in the Western Cape and experts should be given room to do their jobs:

> The same type of water crisis in Cape Town has been run by national government in Durban and Limpopo. We will do things to prevent Day Zero. Yes, the fear of the unknown must be managed, but our enemy is now our failure to manage water, (Küsel & Prince, 2018:1).

The final front-page story in Die Burger's peak month of drought coverage is titled 'Cape Town can defeat Day Zero' and opens with Maimane announcing that "Cape Town's combined water consumption had decreased from 580 million litres per day to 540 million litres in the last few days" (Nienaber, 2018c:1). Maimane calls for Capetonians to continue limiting their consumption to below 50 litres a day to reach the target of 450 million litres per day: "With a little effort it is quite possible. I have already reduced my family's daily consumption to 40 litres per person," (Nienaber, 2018c:1). Maimane also tries to reassure citizens that the City's drought management is on track: "It is clear to me that the previous plans for Day Zero were not strong enough and poorly transmitted. Now, our colleagues in Cape Town and provincial government are constantly working to speed up planning and communication," (Nienaber, 2018c:1). There are multiple frames present in this story, namely: residents save water; city's drought communication has been inadequate; citizens must conserve water; measures the city is undertaking to curtail water usage/ improve drought conditions; and DA versus DA.

Besides Parsons and Olivier, only two other experts are quoted for comment in *Die Burger's* front-page drought coverage. The first is Winter, who warned that it is not enough to only limit water demand or increase reserves:

> We are struggling to achieve the next phase of water management because vision is limited. Water shortages must be adapted to water scarcity without damage to humans and the environment… An integrated approach to management is needed to counteract water shortages, (Barnard & De Lille, 2017c:1).

The second was Van Dam (mentioned in Chapter 1), who explained how Cape Town's current weather pattern can be defined by the term desertification:

> This means an area like Cape Town, which usually has a wet Mediterranean climate, is getting drier and the droughts are getting worse. There is no way we can say the old rain patterns will return. People in Cape Town and the government need to plan for a dry winter, (Prince & Theron, 2018:1).

6.3. Cape Times

The earliest documented front-page article in the *Cape Times* concerning the drought/water crisis was titled 'With dam levels at 42,5%, City urges residents to save water' and appeared on 17 January 2017. The major frames in the story centred around water consumption still being too high, "dam levels are expected to be at 20 percent by around May if current water consumption levels in the province continue, the City says," (Isaacs, 2017a:1), and citizens must conserve water, as cited by Isaacs (2017a:1):

> City spokesperson Priya Reddy yesterday said these levels were predicted for the start of the rainy season… 'We do not expect to run out of water before the next rainy season but constant water usage above the target of 800 million litres per day of collective use, as has been the case, is not sustainable. We have the ability now to turn this situation around. And we will only be able to do this if water use is reduced and members of the public help us to do so'.

This story is the only article in which Reddy is quoted in all front-page coverage of the drought. The aforementioned frames were two of the most prevalent in the *Cape Times* (appearing 24 and 16 times respectively), with measures the City is undertaking to curtail water usage/improve drought conditions (appearing 21 times).

Table 10: Top media frames referenced in Cape Times front-page drought coverage.

Media frame	Number of references in coverage
Water consumption still too high	24
Measures the City is undertaking to curtail water usage/ improve drought conditions	21
Citizens must conserve water	16
Warning of increased water restrictions	15
Concern around Day Zero	14
Water saving burden placed on residents	13
The City waited too long before implementing water augmentation schemes	10
COCT not doing enough to address the water crisis	7
Water users need to develop a new relationship with water/ a "new normal" water resilience approach	7
DA versus ANC	5

This frame was presented mostly as a list of different measures put in place by the COCT to remedy the drought and stave off Day Zero. However, the positive message regarding efforts undertaken by the COCT to address the drought took on a negative spin later down the line with accusations of foul play:

> The DA-led city and province's announcement that Day Zero had been defeated has been met with outrage, with activists saying party politics and electioneering have been put above fact and the interest of Capetonians. DA leader Mmusi Maimane yesterday announced that Day Zero would not occur this year, provided that citizens continue consuming water at current levels, and that there was decent winter rainfall. However, activists have questioned how the city can go from turning taps off entirely to not turning taps off at all in the space of only two months. They have accused authorities and the DA of playing with the lives of their 4 million citizens (Isaacs, 2018a:1).

The next four stories published on the front page of the *Cape Times* after 17 January 2017 appear on 27 January, 1 February, 17 February and 21 February. Based on this data, the first story concerning the drought appeared over half way through January, with the next four being between four and 16 days apart. The story 'Water restrictions tightened' (27 January) opens with the claim that "The city has identified 20 000 water wasters mostly from informal settlements who have cost those households more than R250 million in additional tariffs which have necessitated the

implementation of Level 3B water restrictions," (Nkalane, 2017:1). This story ties in with the most common frame in coverage (water consumption still too high), however a new frame is introduced that highlights conflict between the DA and the ANC, where ANC chief whip in council Xolani Sotashe is quoted denying the City's charge that informal settlement residents were the main water wasters:

> 'This is not a true reflection. This is because water devices are installed in the townships only and therefore allowing big businesses to use water without being monitored. Water-saving initiatives are applied differently here. Poor people are suffering the consequences of the City's ageing infrastructure. Townships are flooded with dirty water leaking from burst pipes. They have huge bills whereas big businesses pay nothing. As a result, people live for days without water because of regular water cuts in the townships' (Nkalane, 2017:1).

Nkalane (2017:1) then writes that De Lille "denied that big businesses were consuming too much water" but doesn't provide any direct quotes from De Lille herself. De Lille is the most quoted source throughout the *Cape Times* coverage (see Table 11 below). It is worth mentioning that not one climate specialist or environmental scientist is among the most quoted sources.

Table 11: Top quoted sources in Cape Times front-page drought coverage.

Name	Title	Number of references in coverage
Patricia de Lille	Mayor of Cape Town	22
Xanthea Limberg	Mayoral Committee member for informal settlements, water and waste services and energy	16
Ian Neilson	Cape Town deputy mayor	8
Anton Bredell	Local government Member of the Executive Council	5
Sputnik Ratau	Department of Water and Sanitation spokesperson	4

Furthermore, the conflict frame between the DA and ANC appears several times throughout the *Cape Times* front page coverage: 'De Lille tables plan to tackle water scarcity' (30/03/17); 'Zero plan for Day Zero' (25/01/18); 'We will supply water to Cape Town' (23/02/18); and 'Zille hauled to court over water failure' (12/03/18). As stated in the previous chapter, drought coverage peaked in the *Cape Times* in February 2018. During this month there were six front page stories dedicated to the drought:

'Level 6B water restrictions kick in' (01/02/18), 'Day Zero – plans had to begin years ago' (01/02/18), 'Tighter control of water usage' (05/02/18), 'Day Zero moves to mid-May' (06/02/18), 'Hope for water dashed' (22/02/18) and 'We will supply water to Cape Town' (23/02/18). As indicated by the first front-page story published in February, the COCT was experiencing level 6B water restrictions at this stage and as a result one would expect a higher level of front-page coverage than only six stories. The lead of 'Day Zero – plans had to begin years ago' states that, according to the WRC, "Cape Town authorities should have begun implementing water augmentation schemes in 2012 or earlier" (Isaacs, 2018b:1). This falls under multiple frames: 1) The COCT is not doing enough to address the water crisis (recorded seven times in total coverage), 2) The city waited too long before implementing contingency plans for the drought/should have begun implementing water augmentation schemes earlier (recorded 10 times in total coverage), and 3) The COCT knew there was a possibility of drought (recorded twice in total coverage). The story also refers to an article published in the *Cape Times* in 1990 wherein the WRC warns that water supplies for Cape Town were expected to dry up in 17 years' time:

> Veteran journalist Barry Streek wrote at the time: 'It is estimated that known fresh water supplies for the Cape Town metropolitan will be fully committed by the year 2007. Thereafter, the reclamation of purified sewage effluent to augment supplies is a distinct possibility (Isaacs, 2018b:1).

According to WRC chief executive Dhesigen Naidoo, similar warnings were repeated in the commission's 2012 report but was "not picked up immediately", adding that the 17 years was not realised because many things happened on the back of that:

> 'Not immediately, but when Kadar Asmal became minister of water in 1994, there were a range of new discussions that were happening around the development of new water laws… The augmentation systems now being looked at in great earnest, and they are very good projects, if they'd had the opportunity to have started two or three years earlier, then there wouldn't be discussion about Day Zero. If the City honestly reflects on its own planning regimen, it too would [conclude] that they should have reacted differently as early as 2012, or perhaps even before that' (Isaacs, 2018b:1).

Despite this, Naidoo acknowledges that City officials and national government operated in an economic environment where they had to prioritise different issues: "It would have been good if there was a more rapid response to water, but it is also explainable why people had to prioritise other things ahead of it," (Isaacs, 2018b:1). It could be argued that this was further compounded by the fact that, as Naidoo explains: "Cape Town's… weather pattern is roughly out of sync by six months with the rest of the country. And so, while the rest of the country was in its most severe phase of drought, it hadn't actually hit the Western Cape yet" (Isaacs, 2018b:1). One can also question the City's forward-thinking abilities in their approach to resource conservation instead of waiting until a crisis situation is reached before implementing augmentation measures. This casts a shadow of doubt over the DA's ability to effectively run the City. Neilson (referenced eight times in total front page coverage) is then quoted by Isaacs (2018b:1), stating that since the report was released, the City had adopted a strong conservation and infrastructure-led approach to water management, implementing aggressive pressure management technology, enhanced infrastructure maintenance, paying for some of the big national dams to have water allocations if required, and widened public education initiatives to drive water conservation and water demand management. According to Neilson:

> 'These plans are reviewed constantly. It is now in fact 28 years after the report was released. Despite our population growth almost doubling since 1996, our water demand has remained relatively flat… Our current situation has been caused by an abnormal climatic event. Low rainfall has now persisted longer than any of the hydrological models could have anticipated. However, our sustained efforts and holistic approach have enabled us to extend our water supplies significantly in a period that is characterised as the worst drought in recorded history' (Isaacs, 2018b:1).

One could argue that Neilson is shifting focus away from the DA's alleged poor management of the drought by blaming the water crisis solely on "an abnormal climatic event" (Isaacs, 2018b:1). This story comes across as a 'he said, she said' and doesn't really offer the reader any tangible conclusion about who/what is mostly responsible for Cape Town's water scarcity. The front-page story 'Tighter control of water usage' published 5 February 2018 outlines how the COCT has been stepping up their water management in the metro and aligns with the previously mentioned frame of 'measures the City is undertaking to curtail water usage/improve drought conditions'; Neilson is again quoted as

well as Limberg (quoted 16 times in total front-page coverage). In 'Day Zero moves to mid-May', a decline in agricultural water use is cited as the reason for Day Zero shifting from 16 April 2018 to 11 May. Neilson is the only source quoted in the story and the main message to readers is that water usage is still too high and consumption must be further reduced:

> 'This is a welcome decline in water usage and gives Cape Town and some of the other municipalities hope, but we need to get our consumption down to 450 million litres per day to prevent the remaining water supplies from running out before the arrival of the winter rains… We are likely to be facing a late and dry winter. With the hot weather predicted over the week ahead and expected high evaporation rates, coupled with an expected increase in water use by our residents as a result of the weather, we dare not rest our laurels now' (Staff writer, 2018:1).

However, despite Neilson's comments about hope for Cape Town and the surrounding municipalities due to the reduction of agricultural water use, the next front-page story in the *Cape Times* is titled 'Hope for water dashed' (published 22/02/18) and quotes the National Treasury stating that "it is not possible for the City of Cape Town to build a new water supply at a scale that would significantly alleviate the short-term effects of the drought crisis" (Maqhina, 2018:1). According to Maqhina (2018:1), international experts have confirmed the National Treasury's claims that temporary, small-scale desalination capacity was costly and would not make a material difference in time:

> 'The City of Cape Town and the Department of Water and Sanitation must agree on plans to develop groundwater resources, and build permanent wastewater reuse and/or desalination capacity at an appropriate scale and in a cost-effective manner'.

The frames of relevance in this story is that the City is not doing enough to address the water crisis (recorded seven times in total front-page coverage), the City waited too long before implementing water augmentation schemes (recorded 10 times in total coverage), and that residents are saving water (recorded four times). As cited by Maqhina (2018:1), while the City implemented various programmes in response to the drought, the Treasury said most residents have shown impressive civic responsibility in curtailing their water use:

> 'This is a result of expanded public awareness of the crisis, resulting in households examining and radically reducing their own consumption patterns. If the City's targeted water saving is achieved and there is some winter rain, then a Day Zero scenario can be avoided'.

One can argue that this story is laden with mixed messages from the headline onwards. The title of the story ('Hope for water dashed') sends a negative message to the reader about the current water situation, this is further supported by the lead and two subsequent paragraphs. Then the story jumps to how citizens have been doing their part, and that Day Zero can be avoided if targeted water saving is achieved (yet the story began with how both the Treasury and international experts claim that it is not possible for the City to provide new water supply on an adequate scale to alleviate short-term effects of the drought). The third last paragraph of the story then states: "On Tuesday, the City pushed back Day Zero by another month, to July 9, following reduced consumption of water," (Maqhina, 2018:1). The three sources quoted in the story consist of the National Treasury, COCT and (then Finance Minister) Gigaba. The final story published in the peak of the *Cape Times'* drought coverage is titled 'We will supply water to Cape Town' and was published on 23 February 2018. The story leads with how "the Department of Water and Sanitation has vowed to ensure water supply to citizens, even when the province's biggest dam, Theewaterskloof, reaches its last 10%," (Adriaanse, Isaacs, Booysen & African News Agency, 2018:1). Then the story jumps to Zille stating that "the immense challenge of the Western Cape's longest drought on record would test the capabilities at all levels of government to their limits" (Adriaanse *et al*., 2018:1). The story then transitions to how "significant rainfall was expected over parts of the Western Cape and the Eastern Cape at the weekend" before jumping to Gigaba's budget speech where he "announced that R6 billion had been set aside for drought relief in the Western Cape and other parts of South Africa" (Adriaanse *et al*., 2018:1). Later, Zille is quoted slamming DWS, saying that to date no national funding had been made available for augmentation in the Western Cape water crisis" (Adriaanse *et al*., 2018:1). Zille adds:

> 'As a result, the City of Cape Town has stepped into the breach with aquifer extraction, water reuse and desalination projects to the tune of some R5,9 billion over the five-year medium-term revenue expenditure framework (Adriaanse *et al*., 2018:1).

The story concludes by detailing how Gordon's Bay residents have been "collecting water from what they believed to be a fresh water spring" (Adriaanse *et al*., 2018:1) but is actually non-potable water and not for human consumption. One can argue that this story was particularly disjointed, covering a multitude of topics not necessarily linked to one another – this is confusing to the reader since each topic isn't explained in-depth and only touched on briefly.

In concluding this section, it is important to note that the majority of sources quoted in the *Cape Times'* front-page drought coverage were government officials or spokespeople. Furthermore, only four climate specialists/environmental scientists were quoted in the coverage, namely: Dr Kevin Winter, a lecturer at the UCT Environmental and Geographical Science department (recorded three times in total front-page coverage); Wits Associate professor Craig Sheridan, director of the Wits Centre in Water Research and Development (recorded once in total front-page coverage); North-West University associate professor and Wits honorary research associate Francois Engelbrecht, chief researcher of the CSIR (recorded once in total front-page coverage); and Dr Neville Sweijd, director of the Alliance for Collaboration on Climate and Earth Systems Science (ACCESS) (recorded once in total front-page coverage). Engelbrecht and Sweijd are quoted in the same story titled 'Water shortage – It's a very grim picture' published on 17 May 2017. Engelbrecht comments on the negative long-term outlook for the south-western Cape region:

> 'It is projected that we will experience a systematic reduction in rainfall as we move deeper into the 21st century. The region is predicted to be drastically warmer. Climate models project that toward the end of the century, the region will experience temperatures between 3 to 5 [degrees Celsius] warmer than it is today. Towards the end of the century the loss of rainfall is projected to be between 10 and 40%. There are grave concerns of the impact of these changes for the south-western Cape. We can see how vulnerable the region is in terms of water security. It's a very grim picture. If we want to stand a chance of mitigating climate change, we must find an alternative energy mix' (Isaacs, 2017b:1).

Sweijd comments on the reasons for Cape Town's water crisis: "The current drought is a combination of a decrease in previous winters' replenishment as well as an increased demand for water," (Isaacs, 2017b:1). According to Sweijd, "the climate models might suggest that there is a greater than 50% likelihood of above average rainfall this coming season, but our confidence in that assessment is still

very low, therefore there is no definitive story to tell about this season's rainfall," (Isaacs, 2017b:1). This is the only commentary they provide throughout the entire story. Sheridan is quoted from a public lecture he gave at UCT with the theme 'Society, water and wastewater', in the story 'I see a tap, but do I have to open it?' published on 23 October 2017. According to Sheridan:

> 'Every drop counts… The reality is that we will probably have enough water to drink. But there are about five million people in the Western Cape metropolitan area… everything else – bathing, washing your clothes, washing floors – has to come down. All these things will count… Water has been undervalued for too long. It is our most critical resource. When you leave a tap open it will have the same effect on a home in Constantia as it does on a home in Gugulethu' (Isaacs, 2017c:1).

Again, this is the only commentary Sheridan provides throughout the entire story. Winter is quoted in three separate front-page stories in the *Cape Times.* The first story is '5100 water clamps' published on 26 September 2017, where Winter comments on how the City's water management devices should have been implemented earlier:

> 'Why could the City not identify the users sooner rather than later? I think they tried the softer approach of creating awareness and spreading education about the crisis, but now people have gone too far and we are desperate… We are in a race against time because our dams are running low. The interventions the City has planned are not ready yet. We have to reduce our consumption to buy us time until the City can start supplementing our supply… We have to reduce our consumption, nobody is clear on what the future holds in terms of this crisis' (Daniels, 2017:1).

The next story in which Winter is quoted was published on 11 October 2017 and titled 'Devices to cut water use installed, but below target'. Unfortunately, Winter is quoted giving similar information to what he gave in the previous story:

> 'The City had hoped that a [gentler] approach would work to get consumption down. The fact is that this has not been successful enough. At the moment, rainfall from January till early October at the Cape Town International Airport weather station… has been 135mm. On average, we would have expected 450500mm' (Isaacs, 2017d:1).

Finally, Winter is quoted in 'Water plans behind schedule' published on 13 December 2017, and comments on the City's planned water augmentation plans: "This is a very ambitious project. We mustn't underestimate the scale and difficulty in bringing online new projects like these, particularly projects at this level. The procurement process is an extremely complex matter, we're not only looking at the technology, but land ownership and legal arrangements," (Isaacs, 2017e:1).

6.4. GroundUp

The earliest documented article from GroundUp concerning the drought/water crisis was titled 'This water crisis won't be Cape Town's last', published on 17 February 2017. This story contained a number of frames (eight in total), some major and others not so prevalent. The most prevalent frame in all of the GroundUp's drought coverage was 'unhappiness with drought management', appearing 12 times in total coverage. This frame was present in the aforementioned story, as quoted by Baigrie (2017):

> Although [Dr Kevin] Winter commends the City, he says it is possibly too little too late. Winter believes restrictions could have been imposed much earlier and maintained. In 2015, and again in 2016, there was below average rainfall. It is crucial the rain falls on the watershed where the dams are, but 'at the moment most of the cold fronts are just missing them,' he says.

Baigrie (2017) then provides the link to a blog where Winter and other academics from the UCT Future Water Institute explain why the City should have acted sooner with implementing water restrictions. According to Winter, Carden and Johnston (2014), "reports from similar drought conditions in 2004 and 2005 show that it takes a month or two before the reduction in water demand

becomes noticeable". Winter *et al.* (2014) also explain that Cape Town is too reliant on stored surface water:

> [This] decreases at a rate of 1% or more every two weeks on average during the summer through evaporation and use. Being over-reliant on this stored water makes the city vulnerable. Therefore, while saving water under the current circumstances is critical, it is not a long-term sustainable strategy. The City of Cape Town needs to be better prepared to deal with recurrent droughts and it has to do so by investing in a range of effective and safe alternative (and, in some cases, previously ignored) water resources.

Winter *et al.* (2014) add that restrictions on their own might not be enough to cope with climate change, a growing urban population and increasing water demand: "Water sensitive cities are not reliant on single sources of water and are better prepared to meet the potential risks of bringing alternative sources into the water resource mix… the additional consideration of a diversified water supply system will likely be required to enable the city to deal with the recurrence of dry years." Other major frames present in this story include: COCT's drought communication has been inadequate; and mixed messages regarding the drought. Unlike in the print media in this study, GroundUp places more emphasis on having a scientific narrative; this is even visible when looking at the publications top quoted sources throughout their coverage of the drought (see Table 12 below).

Table 12: Top quoted sources in GroundUp drought coverage.

Name	Title	Number of references in coverage
Xanthea Limberg	Mayoral Committee member for informal settlements, water and waste services and energy	14
Ian Neilson	Cape Town deputy mayor	4
Dr Kevin Winter	UCT Environmental and Geographical Sciences lecturer	4
Piotr Wolski	UCT Hydro-climatologist	*4
Patricia de Lille	Mayor of Cape Town	3
JP Smith	Mayoral Committee member for security	3

* Piotr Wolski provided content to GroundUp in the form of analyses which is why he is also included in quoted sources.

As the above table depicts, Wolski provided GroundUp with four articles, namely: 1) 'Is Cape Town's drought the new normal?' (01/11/17); 2) 'Water crisis: the more we know, the better we can respond' (16/11/17); 3) 'How severe is the drought? An analysis of the latest data' (22/01/18); and 4) 'Will there be more rain this winter?' (15/03/18).

In 'Is Cape Town's drought the new normal?', Wolski (2017a) attempts to use available climate data in order to answer a variety of questions, some of which include: What is meant by a drought? Is this drought caused by climate change? Could [the drought] have been predicted? Is this drought the New Normal? According to Wolski (2017a), from a climate perspective, it is often assumed that any change in question is the result of human activity influencing the climate. Wolski (2017a) adds:

> Does [this] mean that this year's drought will be a regular thing in the future? Will every future year look like this one? Or just some? Will there be wet years? Or never again? Will the dams ever fill? Or will we constantly hover around them being at best at 37% of full storage? Or even lower?

Wolski (2017a) begins answering these questions by referencing an article from the UCT Climate System Analysis Group (CSAG), also written by Wolski. Here, Wolski (2017b) refers to a number of graphs that show how rainfall has been steadily declining over the years:

> The total rainfall at the Cape Town airport (CTA) is so far below that experienced in the same part of the year during the last 40 years [Figure 10]. The other stations do not have that many years of data available, but they show a similar pattern – this year's rainfall is substantially lower than the rainfall in the last 4-6 years [Figure 11].

Focus is then shifted to the return interval of the drought, which means "how often, on average, can we expect a drought of a magnitude of the one that we have now, or more severe, to occur?" (Wolski, 2017b). According to Wolski (2017b), hydrological droughts are a particularly complex concept, and it is the hydrological drought that affects the Cape's dams.

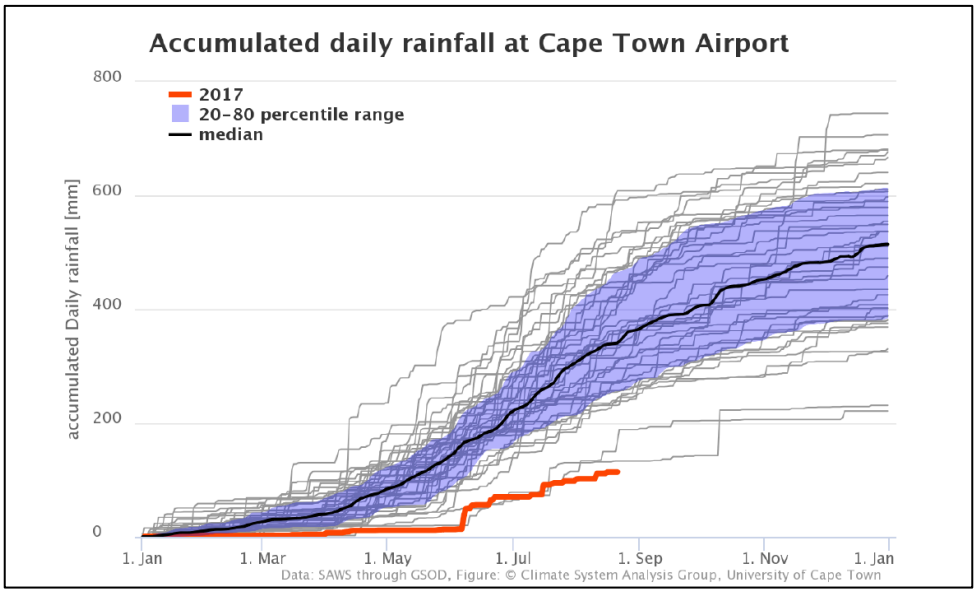

Figure 9: Graph showing accumulated daily rainfall at Cape Town Airport (Wolski, 2017b).

A hydrological drought may be the result of a variety of interplaying characteristics of the rainy season such as "timing, magnitude and intensity of rainfall events" (Wolski, 2017b). In order to keep things as simple as possible, Wolski (2017b) uses total annual rainfall to characterise the drought. Determining how often the current drought is expected to occur requires fitting a probability distribution function to observed total annual rainfall data and determining where on that function this year's rainfall value falls, "that value can then be translated into more informative indices such as probability of non-exceedance (i.e. probability that in any single year rainfall will not exceed this year's value), or return interval (i.e. number of years that, on average, separate years with rainfall similar to this year's), or frequency of occurrence (i.e. how frequently do years similar to this year occur)" (Wolski, 2017b). Wolski (2017b) adds that for the uninitiated, this translates into "normal human" as follows:

> Based on past observations, I need to determine how frequently years with annual total rainfall of various magnitudes happened in the past. There should be a relationship between how frequently a given annual rainfall occurred, and its magnitude. I can use that relationship to describe how frequently the rainfall observed in 2017 is expected to happen 'in general'.

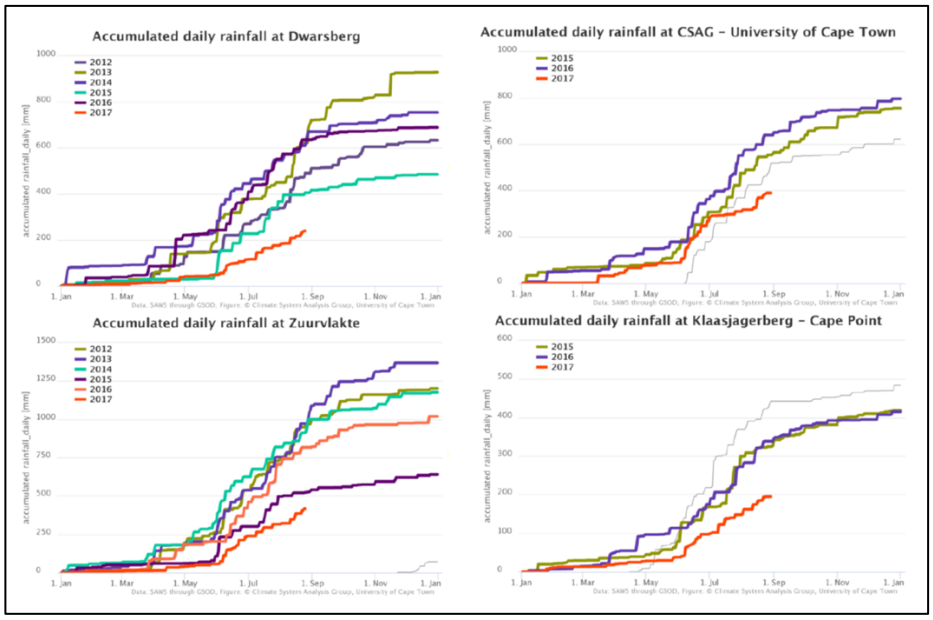

Figure 10: Graphs showing accumulated daily rainfall (Wolski, 2017b).

According to Wolski (2017), the aforementioned rainfall figures were the only relevant data available to the CSAG: "The Cape Town Airport (CTA) is but the only station in Western Cape with good quality data available through GSOD – a global meteorological data repository used by weather forecasters and aeronautics sector. And satellite rainfall data, unfortunately, capture Western Cape rainfall in a rather unrealistic fashion." After searching through the South African Weather Service (SAWS) datasets, Wolski (2017b) identified Altydgedacht Station in Bellville (not very far from CTA) which has a comparatively similar rainfall regime to that recorded at CTA (see Figure 12), with only three years missing in the 1923-2015 record. Wolski (2017b) uses the rainfall data from Altydgedacht in order to make projections about the current drought.

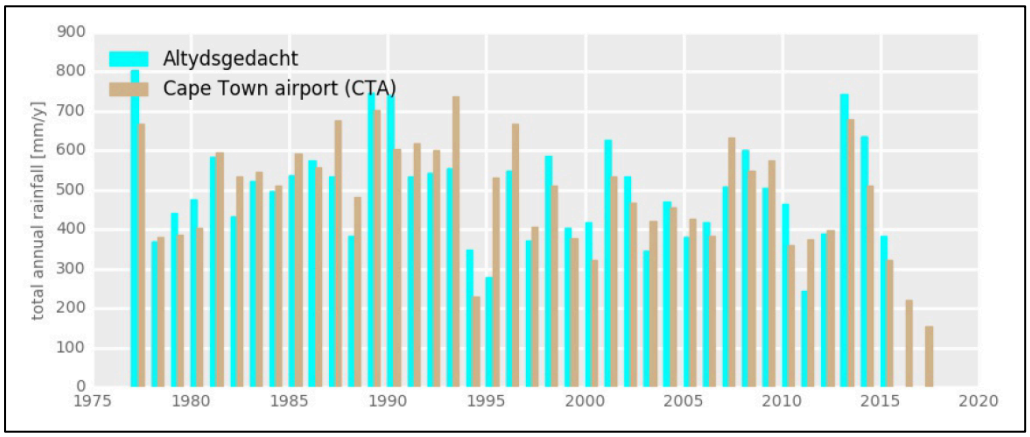

Figure 11: Graph showing differences in data between Altydgedacht Station and Cape Town Airport (Wolski, 2017b).

Wolski (2017b) filled in the three missing years (1929, 1946 and 1947) with the long-term mean annual rainfall, and estimated the 2016-17 figures. Now Wolski (2017a) has a rainfall data series covering 1920 to 2017 (Figure 13) to use for making drought projections. Wolski (2017a) explains that "the current drought is clearly noticeable in this dataset: the last two points on the line (2017 and 2016) are actually the lowest in that record".

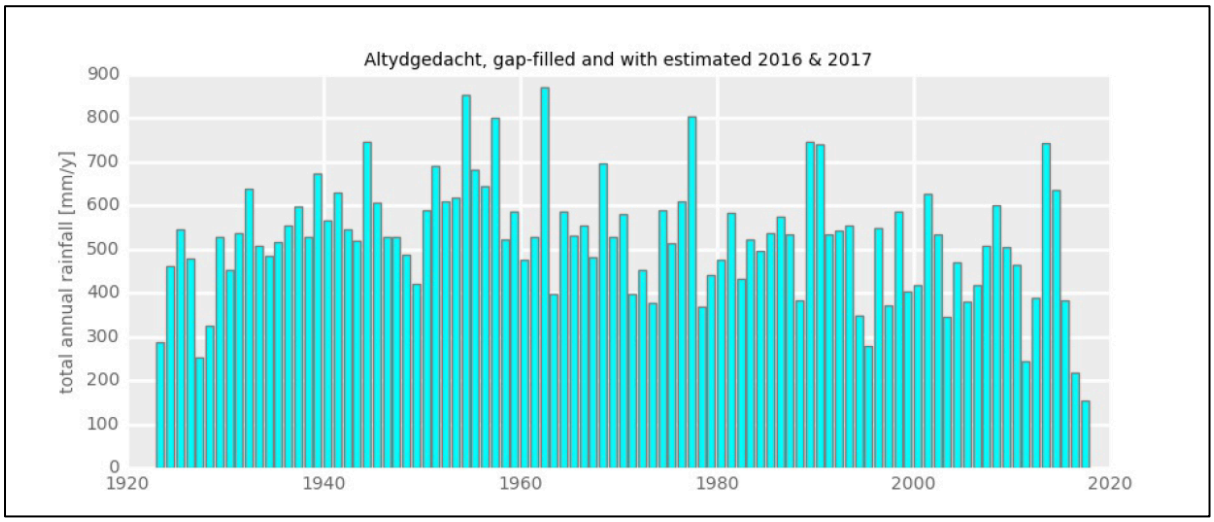

Figure 12: Graph showing time series of total annual rainfall at Altydgedacht Station, gap filled with 2016 and 2017 estimates (Wolski, 2017a).

According to Wolski (2017a), the below graph (Figure 14) also illustrates a couple of other characteristics of Cape Town's climate, otherwise known as climate variability:

> There is high year-to-year variability - i.e. every year is different, usually 'jumping' from lower to higher, or from higher to lower between the years. But there are cases of two high rainfall years in a row (e.g. 1989-1990) or two low rainfall years in a row (2016-2017). There are very wet years (for example 1962 and 1977), and there are very dry years (2017, 2016, 2013). There is a period of seven wet years (1950-1957) but, interestingly, there is actually no extended period with only dry years. There appears to be a positive trend (i.e. gradual increase in rainfall) between 1920 and 1960, and then a negative trend between 1960 and 2017. The mean annual rainfall over the 1920-2017 period is 522mm/year.

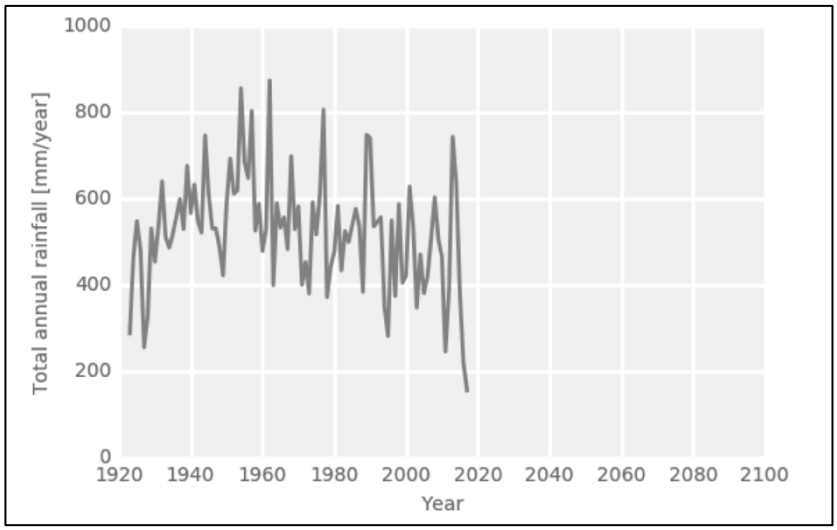

Figure 13: Graph showing total annual rainfall at Altydgedacht Station (Wolski, 2017a).

Wolski (2017a) warns against assuming that climate change is 100% accountable for this climatic variation:

> We have a year-to-year rainfall variability in rainfall because moving high pressure and low-pressure systems interact with each other, and with other systems around them in a not always regular manner. As a result, they are sometimes stronger, sometimes weaker, sometimes located more to the south, sometimes more to the north, sometimes towards the east.

What this means in laymen terms, Wolski (2017a) explains, is that "high rainfall years occur in Cape Town when the lows have really low pressure, and/or form very frequently, and/or when the westerly belt moves far north". Droughts occur when the situation is the opposite, however there is a continuity of these conditions; "we don't just have high rainfall years and low rainfall years, we have the whole range of years associated with in-between pressure levels and in-between positions of the westerlies" (Wolski, 2017a).

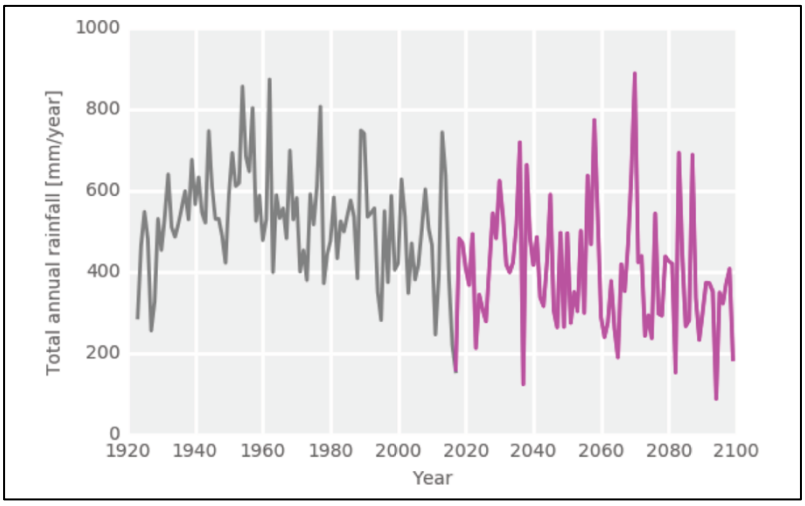

Figure 14: Graph showing projected annual rainfall if Cape Town's climate continued getting drier (Wolski, 2017a).

Wolski (2017a) adds that if one were to assume that Cape Town's climate is getting drier, one could expect to observe something as follows (see Figure 15). According to Wolski (2017a), "rainfall variability in the period after 2017 is similar to that in the pre-2017 period and there appears to be a downward trend, so rains are progressively lower". It is important to note that with this downward trend, there are still wet years, "perhaps even wetter than the wettest we've had so far… [this] is likely due to human-caused climate change" (Wolski, 2017a). Wolski (2017a) again reminds readers that the variability is due to climate variability in general. Although the future in the above graph (Figure 15) looks realistic, Wolski (2017a) emphasises that it is not real:

> The data for the future in this graph are made up. It does not show the actual future. We expect this type of rainfall variation but not necessary this sequencing of wet and dry years… Yet, we do run climate models to obtain long-term projections of future climate. There are currently some 50 of them at various institutions across the world. So, what gives? Simply, global climate models are used to project climate, i.e. long-term mean conditions, not conditions in a particular year which are unpredictable.

The media frame that comes through most strongly in this story is then 'uncertainty manufactures difficulties in making projections that are 100% accurate' (recorded five times in GroundUp's total drought coverage, see Table 13 below):

> Every projection is different. There are different patterns of succession of wet and dry years. In some projections there are many years of drought. In some there are few. The important thing is that no single projection is likely to represent the actual future. But all in all, together they represent what the future is likely to be (Wolski, 2017a).

Just over two weeks later, GroundUp published 'Water crisis: the more we know, the better we can respond'. Here, Wolski (2017c) leads with the importance of "transparent decision-making and better access to environmental information and data" during times of climate crises. This is an important article as it emphasises the imperative need for clear, open communication in times of uncertainty. Again, multiple frames are present in this story (a recurring trend in GroundUp's coverage), with the first frame being 'saving water is a collective effort where everyone must play their part' (documented five times in total coverage): "Dealing with the crisis, in large part, depends on asking all of us to alter our lifestyles by reducing water use and recycling water," (Wolski, 2017c).

Table 13: Top media frames referenced in GroundUp drought coverage.

Media frame	**Number of references in coverage**
Unhappiness with drought management	12
Measures the City is undertaking to curtail water use/ improve drought conditions	10
COCT's drought communication has been inadequate	8
Mixed messages regarding the drought	8
Drought a serious issue	7
Concern around Day Zero	7
Water consumption still too high	7
A lot of questions still left unanswered	7
Misinformation and lack of education surrounding drought	7
Local, provincial and national gov. all responsible/ accountable for access to water	5
Adding more water to the supply system won't necessarily delay Day Zero	5
Saving water is a collective effort where everyone must play their part	5
Uncertainty manufactures difficulties in making projections that are 100% accurate	5

Wolski (2017c) then explains that a sense of community, shared responsibility and trust is needed to fully understand the water crisis:

> While the goal of reduced water use can possibly be achieved by regulation and enforcement, actions stemming from the understanding

> that this is a crisis shared by all — the authorities, citizens and communities — are likely to be much more effective. To build that understanding requires firstly, a sense of community and shared responsibility, and secondly, considerable level of trust in your community, other communities and the authorities.

According to Wolski (2017c), trust is created when data and information are readily available to the public, and transparently used in the process of planning and decision-making. Wolski (2017c) adds how "cognitive psychology and journalistic experience shows that to effectively achieve such a goal, information has to be suitably packaged… It should be visual, interactive, contextualised, and accompanied by a narrative referring to our experiences". A link to an academic paper is then provided titled 'Narrative Visualisation: Telling Stories with Data'. In the aforementioned paper, Segel and Heer (2010) identify distinct genres of visualisation, noting a central concern in the design of narrative visualisations: "The balance between author-driven elements – providing narrative structure and messaging – and reader driven elements – enabling interactive exploration and social sharing." Segel and Heer (2010) add that narrative visualisations differ in important ways from traditional forms of storytelling:

> In journalism, one presents related material and sources together in a 'block progression' to have clear and logical transitions, and digresses 'often, but not for long'. Interactive stories present difficulties for these recommendations, as giving narrative control to the reader permits lengthy unordered digressions… Generalizing… data stories appear to be most effective when they have constrained interaction at various checkpoints within a narrative, allowing the user to explore the data without veering too far from the intended narrative.

Although Wolski (2017c) praises the availability of the COCT's data on the state of water resources (dam levels) that can be accessed easily on the internet, directly from DWS and in the print and broadcast media, numerous additional pieces of highly relevant information are still difficult to get a hold of:

> Data on current rainfall, which is a key element in the drought puzzle, are available form SAWS for individual locations, but these data are

> not available retrospectively (only current day/month can be seen). The [SAWS] also provides rainfall maps for current and past months and similar maps are available from the Agricultural Research Council. The maps are a slightly better alternative to data from locations, although still difficult to interpret for relating current drought to longer-term weather. Current and retrospective rainfall data can be accessed through the National Oceanic and Atmospheric Administration, but their format leaves them beyond the reach of many. Data on average and current water use by different sectors is also difficult to come by.

It is worth mentioning that Wolski (2017c) provides the links to all of the above referenced maps and resources so that readers can take their understanding of the drought further if they wish to attempt to read the data. Wolski (2017c) argues that the availability of data would prevent blame games and unhealthy speculations: "How are the people of Cape Town to strive to use 87 litres per day or to collectively reach 500 million litres per day, while we don't know whether our efforts are at least matched by other water users dependent on the same source – agriculture and other small municipalities?" With this, the final frame present in the story is 'City's drought communication has been inadequate' (recorded eight times in total coverage):

> Projecting the dam levels towards the next rainy season (June 2018) is becoming more and more relevant. This is because of the threat of Day Zero, the (hopefully avoidable) day when there is no more water in the city's dams. Availability of such projections is an absolute must if we are to understand and trust the City's assurances of having things under control, continuing calls for further reduction of water use and water supply management actions such as water rationing. Yet, such information is nowhere to be found in the official City data, (Wolski, 2017c).

The third story by Wolski, titled 'How severe is the drought? An analysis of the latest data' was published just over a month later than the former article. Here, Wolski (2018) opens with how the causes of Cape Town's water crisis are hotly contested: "There is a drought, of course… But there are also other reasons brought up in the public discourse, particularly on social media, such as

population and water demand growth, unreported agricultural use, invasive species sucking out water in catchments, poor planning and mismanagement of water supply system, and lack of foresight in development of new water sources." With uncertainty around why the water crisis is happening, another major frame is 'a lot of questions still left unanswered' (recorded seven times). 'Misinformation and a lack of education surrounding the severity of the drought' is also a common frame throughout GroundUp's drought coverage (recorded seven times in total):

> Few people question whether there is a drought: what is questioned is its severity. This has important implications. If the drought has been mild, then it should not have resulted in a major water crisis. If it has been severe, then it has just been a bad ticket on the climate lottery, and all the other factors would be at most aggravating factors but not the main cause. The issue is obviously socially tense, creating wedges between authorities and citizens, between those who institute water restrictions and those who have to bear the brunt of them, (Wolski, 2018).

According to Wolski (2018), the aim of the aforementioned article was to "look at the most up-to-date rainfall data to assess how severe the current drought is", something he previously attempted to do but with less extensive data. However, even though Wolski (2018) claims to have "a more comprehensive dataset [this time around]… Not all stations in this dataset have good records; there are numerous gaps". This resonates most closely with the frame 'uncertainty manufactures difficulties in making projections that are 100% accurate'. This being said, Wolski (2018) states that DWS provides data from four stations that measure rainfall in the vicinity of the Western Cape Water Supply System (WCWSS) dam region, "and have no significant gaps or systematic errors from 1981 through 2017", namely: Vogel Vallij, Zacharashoek, Theewaterskloof and Kogel Baai (Figure 16). Wolski (2018) explains that the year in the below figures is taken to be between November and October:

> This is because October is more or less the end of rainy season, and the last month when an increase in dam levels may be recorded. Also, because at the time of writing this, data are available only till October 2017. Putting the end of the year in October allows me to use the 2017 data without estimating rainfall in November and December.

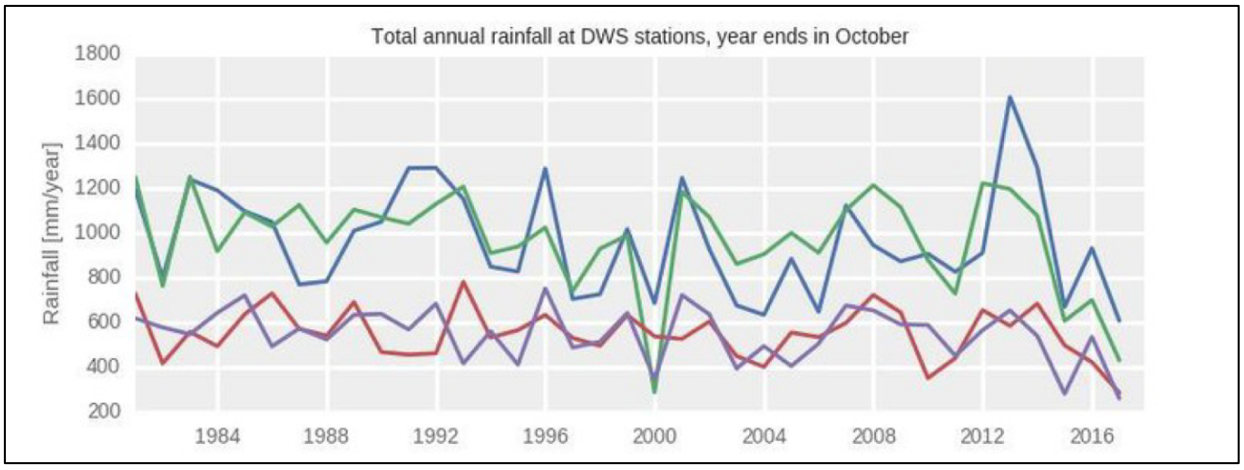

Figure 15: Graph showing annual rainfall at DWS stations from 1981 to 2017, year-end October (Wolski, 2018).

Wolski (2018) then calculates the average of the above data in order "to make further analyses more robust… And to account for the fact that the drought is likely of a multi-year character". This is shown by plotting the two-, three- and four-year average rainfall. According to Wolski (2018), the above plots (Figure 17) tell a consistent story: "[Last year (2017)], as well as the preceding two-, three- and four-year average rainfall in the region are the lowest since 1981… What [this] means is that the 2017 drought was at least as rare as once in 36 years."

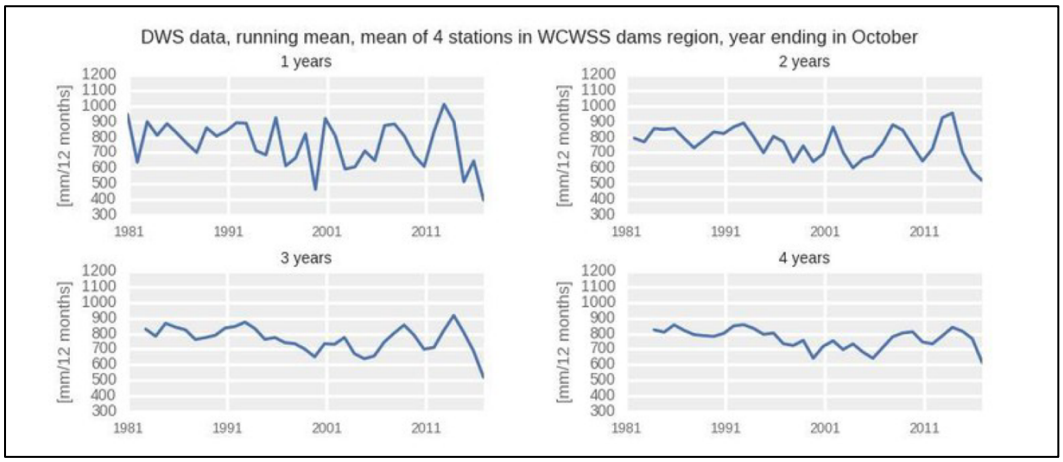

Figure 16: Graph showing running mean of four DWS stations in WCWSS dam region, year-end October (Wolski, 2018).

Wolski (2018) argues that only looking at the last 36 years "is not enough" since there were also droughts in the 1920s and 1970s that "we need to compare the current drought to". The DWS data

does not span further back than 1981, therefore Wolski (2018) switches to rainfall data from the SAWS, where some stations in the Western Cape go back as far as the 1800s:

> Unfortunately, there isn't any overlap between the DWS and SAWS rain stations, so we cannot simply extend the record of the four stations used above. We need to repeat the analyses on the entire SAWS dataset. If available SAWS data are screened in a similar manner as the DWS data were (i.e. for continuity and consistency of record), we get five stations with data covering the period 1933 to 2017. Only three are located in the WCWSS dam region: Vrugbaar, Rustfontein and Nuweberg [Figure 18].

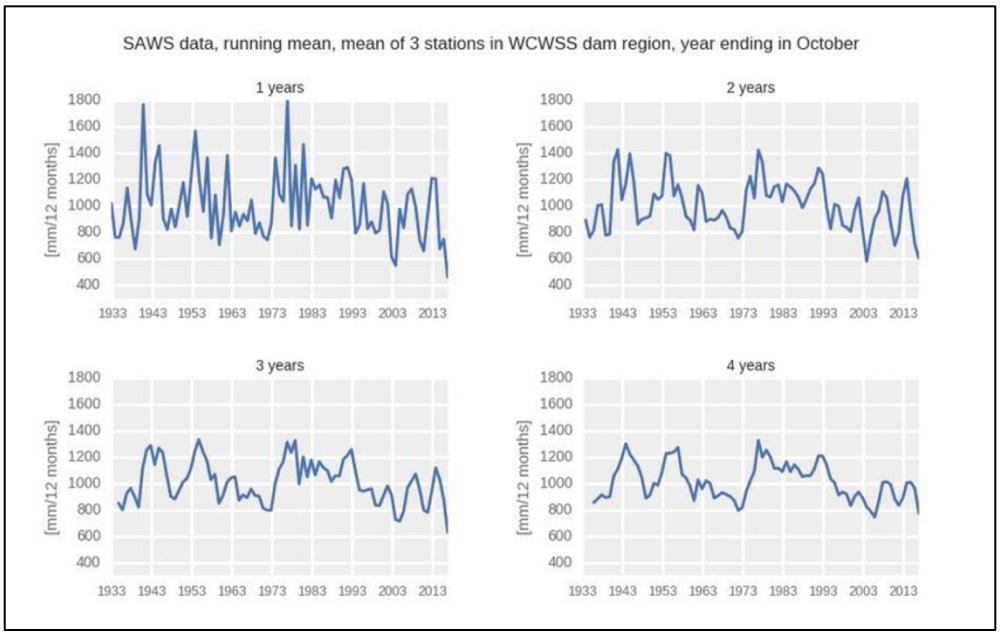

Figure 17: Graph showing running mean of three SAWS stations in WCWSS dam region, year-end October (Wolski, 2018).

Wolski (2018) explains that, based on the above figures, 2017 was the lowest rainfall year since 1933: "They also show that the mean rainfall in the three preceding years, 2015-2017, was unprecedented… However, the two-year mean as well as the four-year mean leading to 2017, were not the driest." Wolski (2018) concludes his analysis by stating that the drought, manifested through low rainfall in 2015 to 2017, was very rare and severe: "My findings are that this kind of drought occurs once in 311 years with a 90% confidence that it falls between 105 and 1,280 years." This aligns with the frame 'drought is a serious issue' which was recorded seven times in GroundUp's total drought coverage.

In 'Will there be more rain this winter', Johnston and Wolski (2018) analyse the accumulative daily rainfall at CTA over a series of months to arrive at the following conclusions: "1) At the end of April, if we are above normal [rainfall], it's likely we'll have above normal rainfall by year end; 2) At the end of May, if we are below normal [rainfall], it's likely we'll have below normal rainfall by year end; and 3) At the end of July, if we are in the normal range, it's likely we'll have normal rainfall by year end."

GroundUp's drought coverage peaked in January 2018 with 10 stories being published, namely: 'What national government is doing about Cape Town's water crisis?' (12/01/18); 'Coalition calls for new measures to tackle drought' (16/01/18); 'Facts and myths about Cape Town's water crisis' (18/01/18); 'How severe is the drought? An analysis of the latest data' (22/01/18); 'Day Zero and Cape Town's cacophony of chaos' (24/01/18); 'Have you started your water committee yet?' (26/01/18); 'It's already Day Zero in Siyahlala' (26/01/18); 'Drought – City answers your questions' (27/01/18); 'Hundreds protest against City over water crisis' (29/01/18); and 'City's model shows how we can avoid Day Zero' (30/01/18).

The story 'What national government is doing about Cape Town's water crisis?' contains multiple frames, with the first frame highlighting how local, provincial and national government are all responsible/accountable for access to water:

> Though much attention has been focused on the City of Cape Town's attempts to manage the water crisis, in terms of the Water Act of 1998, the national government is the 'public trustee' of the nation's water resources and must ensure that water is 'protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons'. (Payne, 2018).

Sputnik Ratau, spokesperson for the Department of Water Affairs, is quoted explaining the different measures put in place by national government in order to address the water crisis in the Cape. These measures include, as quoted by Payne (2018): 1) Fast-tracking the process of increasing water to the Voëlvlei Dam (originally set for 2024, now scheduled for 2019), which involves pumping winter rainfall from the Berg River into the dam; 2) Monitoring heavy water users; 3) Contact with the Borehole Water Association of South Africa to raise awareness about the drought within the association; and 4) The department being on emergency standby to urgently implement dredge canals in the Voëlvlei Dam in order to access the last 10% of water that cannot be used at the moment. When

asked what the department would do if Cape Town should run out of water at the end of April 2018, Ratau answered by stating that "we are not at Day Zero", adding that the department had put "intervention plans" in place, however, he did not explain what these plans were (Payne, 2018). This resonates most with the frame 'a lot of questions still left unanswered' (recorded seven times in total drought coverage). The frame 'water consumption still too high' (recorded seven times) is also present in the story: "Mayor Patricia De Lille said this week that because water consumption was 'too high' over the holiday period, Day Zero had been moved from 29 April to 22 April 2018," (Payne, 2018). The last recorded frame in the story deals with how the Western Cape needs more money from national government for drought relief (recorded twice in total coverage), with the provincial government estimating that they will "need an extra R542 million to help areas affected by the drought" (Payne, 2018).

In 'Facts and myths about Cape Town's water crisis', GroundUp (2018) breakdowns the different rumours circulating about the drought. The first myth dealt with is "migration from the Eastern Cape to the Western Cape is the cause", where "population growth is to blame for the water shortage" (GroundUp, 2018). GroundUp (2018) explains that although this may be true in a "limited sense… Population growth alone doesn't explain the water shortage". A water consumption graph (see Figure 19) from the COCT is then provided that shows how water use has stabilised since 2000. The frame of 'population growth not explaining the current water shortage in the Western Cape' only appears in this one story. The graph also shows how consumption has dropped considerably in the last year "with increased restrictions and awareness" (GroundUp, 2018).

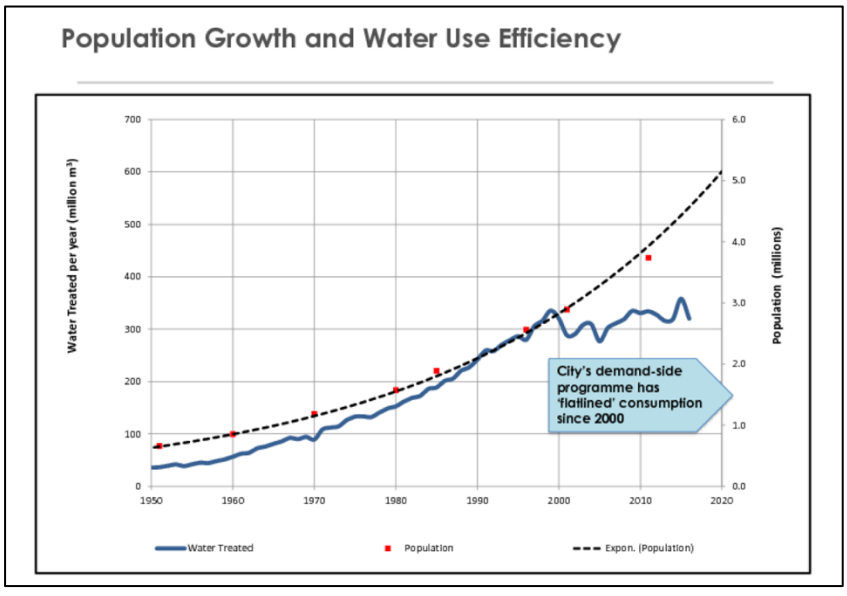

Figure 18: Graph showing Cape Town's population growth and water use efficiency over 70 years (GroundUp, 2018).

GroundUp (2018) also argues that people from the Eastern Cape primarily move to the City's informal settlements:

> In informal settlements, households generally have to get their water from communal taps; usage is much lower on average than formal households. Long showers, full baths, maintaining gardens and keeping swimming pools filled are not a common feature of informal settlement living.

Reference is then made to an article written by the head of UCT's Urban Water Management Department, Professor Neil Armitage, where it is estimated that less than 5% of the City's metered water is consumed by informal settlements. Armitage also explains how Cape Town's water systems lose 15% through leaks and unaccounted-for demands which is, according to Armitage, "world class" since the national average is sitting "somewhere around 36%" (Nicolson, 2017). Armitage continues:

> Fine, the suburbanites say, but there is a lot of water wastage in Cape Town's informal settlements, right? No. Cape Town's informal settlements use only 4.7% of the water consumed in the metropolitan area. And before you try to point to business, they're not the culprit either. Of all the metered water (which excludes leakage) used by Cape Town over the course of a 'normal' year, 4.7% is used by informal settlements; 15% is used by retail, offices and manufacturing; 7.7% is used by government and government facilities; and 6.2% is classified as "other" uses. That means the remaining 66%, i.e. two-thirds, is used by formal residential areas, (Nicolson, 2017).

The next myth busted by GroundUp (2018) involves an article that was published on the Daily Vox that was uncritical of a "sensationalist" video claiming to show how livestock farming is draining the dams:

> The video shows water from Theewaterskloof being released to farms. The "vloggers" then throw about misleading statistics about how much water it takes to make a cow, a bar of chocolate, a cup of coffee and other edibles. Presumably you're supposed to be so outraged that you immediately march to Patricia de Lille's office and demand that she puts an end to all farming in the Western Cape. It's ridiculous.

GroundUp (2018) adds how "agriculture is critical to the Western Cape economy, and the loss of crops, even farms, may be one of the consequences for the city if the dams run dry". Jeanne Boshoff of Agri Western Cape provides a detailed rebuttal of the video, which is provided by GroundUp (2018):

> Hundreds of hectares of citrus trees have been cut back and hundreds of hectares of orchards have been pulled out in an effort to save the little water allocated to producers. [This] means smaller yields [and] less food. Indications currently are that the deciduous fruit harvest will be 20% smaller. This means [fewer] seasonal workers will be employed, and for a shorter period of time: an estimated 50,000 seasonal workers will have below normal income or no income at all… Grazing and feed shortages resulted in massive culling, causing local red meat supply to tighten, and meat price increases as a result of the drought induced supply shortages.

Next, GroundUp (2018) looks at the claim that this drought is the worst on record in Cape Town's history, citing "a lack of rain in the water catchment area, probably a consequence of climate change" as the main reason for the water shortage. GroundUp (2018) then provides the links to two articles in order to validate the claim, the first being 'Is Cape Town's drought the new normal? by Wolski (2017a) (this article was discussed near the beginning of the GroundUp section), and the second being a UCT news article titled 'Why Cape Town's drought was so hard to forecast' by Wolski, Hewitson and Jack (2017). According to Wolski *et al.* (2017), rainfall data visualisations from the CSAG show that 2017 was one of the driest years in recent decades:

> But the region's predicament wasn't caused by the low 2017 rainfall. It's in trouble because 2017 followed two successive dry winters. Such

> severe multi-year droughts are very infrequent, occurring perhaps as rarely as once in a millennium. Water supply systems are not designed to withstand their impact.

Wolski *et al.* (2017) add that there is no clear, research-based defensible answer to the question of what drives such extreme droughts but research suggests that the possibility of extreme drought is increasing in the Western Cape:

> Future climate projections show a possible shift towards a drier, more drought prone climate. This means that it is possible that man-made climate change has contributed to the severity of the current drought, and even though it is an extremely rare event, similar droughts may not be rare in the future. On a positive note, there will still be wet years, but likely not as many.

The other myth/fact discussed by GroundUp (2018), which they dub as "complicated", is that responsibility for sorting out the water crisis ultimately lies with the municipality:

> The Constitution gives municipalities exclusive power over 'potable water supply systems and domestic waste-water and sewage disposal systems', but higher tiers of government must monitor and support development of local government capacity. And, what is more, they must 'see to the effective performance' of municipalities' water functions.

According to the Water Act of 1998, "National Government, acting through the Minister, has the power to regulate the use, flow and control of all water in the Republic" (Republic of South Africa, 1998:10). GroundUp (2018) concludes by adding that local, provincial and national government are all accountable: "The day-to-day management of the City's water is the job of the municipality (including cleaning and reticulation), but national government is responsible for oversight and bulk water supply. Hence, local, provincial and national government are all accountable."

GroundUp (2018) then emphasises that there are no easy solutions to the water crisis, explaining how many measures are needed, not just catching the water off Table Mountain, which is no "trivial measure". Although the City is taking several measures to address water scarcity, "more should be done to use untapped water sources including catching more water from the mountain before it runs into the storm water system or the sea, but that is not a quick-fix solution" (GroundUp, 2018). Finally, GroundUp (2018) touches on how the municipality is having a very ill-timed internal fight:

> Cape Town is facing one of its worst environmental crises. Leadership is needed that people can trust. That means that when City politicians and officials provide information on the water crisis we need to be confident that it isn't spin. And when the mayor proposes a drought levy, we need to know that her party supports it. Divisions and playing politics with water will be disastrous for Capetonians. The City should put a recognised and respected water expert in charge of all communications on the drought.

There are nine frames present throughout the aforementioned story, these include: 1) Concern around Day Zero (recorded seven times in total drought coverage); 2) Population growth alone doesn't explain water shortage (recorded once); 3) Agricultural losses due to drought (recorded three times); 4) Job losses due to drought (recorded three times); 5) Business security at risk due to drought (recorded three times); 6) Drought a serious issue (recorded seven times); 7) Local, provincial and national government all responsible/accountable for access to water (recorded five times); and 9) DA versus DA (recorded once).

'Drought – City answers your questions' is a question and answer style article that deals with reader queries regarding the drought, where Neilson (quoted four times in total drought coverage), Smith (quoted three times) and Priya Reddy (quoted once). In 'Hundreds protest against City over water crisis', the frame 'misinformation and lack of education surrounding the drought' (recorded a total of seven times throughout GroundUp's drought coverage) is clear when Shaheed Mahomed of the Cape Town Water Crisis Coalition (CTWCC) said that although the water crisis is real, "Day Zero is an invention of the City" (Hendricks, 2018). According to Mahomed, the City is trying to instil fear in order to privatise water for profit: "They want to bring in desalination. They want to bring in those water management devices so that they can effectively exercise control of the lives of

the people," (Hendricks, 2018). Another frame present is 'unhappiness with drought management', which is first seen in the lead of the story:

> Hundreds of people joined outside the civic centre to protest against the City of Cape Town's management of the water crisis. The CTWCC is calling for government to remove water management devices, to stop any drought levy or water tariff increase plans and no privatisation of water supply, (Hendricks, 2018).

Two residents present at the protest are then quoted; the first is Bo-Kaap resident Deborah Gericke, who argues that the water crisis is being handled badly by the City, and that farmers and businesses should also be cutting back: "It's not just down to everybody on 50 litres per day. It does seem to be that the burden is being placed on us rather than businesses or agriculture," (Hendricks, 2018). The second resident quoted is Nazeer Sonday, a farmer and member of the Philippi Horticultural Area Food and Farming Campaign, who claims that "there is no water crisis; there is a management crisis" (Hendricks, 2018).

6.5. News24

Since News24 published over 400 articles during the time period of this study (1 January 2017 – 31 April 2018), a sample of every tenth article, starting at the first recorded article in the time period (04/01/17*) was collected. Thus, a total of forty-one articles were collected for framing analysis. News24 followed a number of trends in their coverage of the water crisis, with stories most notably covering the implementation of each level of water restrictions, as well as what each successive level entailed.

The first article published by News24 (*appearing on 4 January 2017) was titled 'Cape Town threatens to ban watering of gardens', and leads with how the COCT will be forced to "ban watering of gardens if more residents don't cut back on their water use" (Evans, 2017a). According to the City, as quoted by Evans (2017a): "Unless all residents reduce their water usage to meet the target, even more stringent restrictions are likely in the near future." The three prevalent frames in the story are thus: 'Water consumption still too high'; 'citizens must conserve water'; and 'warning of increased water restrictions'. As previously mentioned, Evans (2017a) then reminds readers that Cape Town is currently on Level 3 water restrictions, explaining what that means for consumers.

Table 14: Top media frames referenced in sample of News24 drought coverage.

Media frame	Number of references in coverage
Citizens must conserve water	9
Drought a serious issue	9
Warning of increased water restrictions	7
Measures the City is undertaking to curtail water usage/ improve drought conditions	7
Water consumption still too high	6
Consequences for high consumers	6
Citizens saving water	5
Dam levels drop/ low dam levels	5
Water saving burden placed on residents	5
Job losses due to drought	5
DA versus ANC	5

News24's drought coverage was at its highest in January 2018, with 83 stories covering the drought. On 5 January 2018, News24 published a story titled 'Food vs water: Where is the Cape's water really going?', where Wallace (2018) explains how "local vlogger Adam Spires [and TV personality Siv Ngesi], [shed] new light on the Cape's extreme water crisis – and where our water in these dire *straights* is going". Wallace (2018) should have instead written dire *straits* which means "a very bad situation that is difficult to fix" (Cambridge Dictionary, 2018). The subject of this story (a YouTube video titled 'Where the Capes water is really going') was also disputed in detail by Jeanne Boshoff of Agri Western Cape in a story published by GroundUp on 18 January 2018 ('Facts and myths about Cape Town's water crisis'). As previously mentioned, Spires and Ngesi refer to a number of "misleading statistics" (GroundUp, 2018) from the Global Food Report to "debunk a myth that millions and millions of litres of water are purposefully being released downstream in spite of it being the most severe water crisis on record" (Wallace, 2018). Wallace (2018) then adds:

> Sadly, the myth is in fact reality… The reason? Farming… Cape Town receives its water supply from six major dams, one of them being Theewaterskloof Dam, and 60% of that water allocation goes to farms. The amount of litres of water used to make a single cup of coffee, a bar of chocolate, a kilogram of cheese or just two chicken breasts is in the thousands, and up to or more than 30 days of your careful, cautious water rationing.

Table 1: Typical values for the volume of water required to produce common foodstuffs[37]

Foodstuff	Quantity	Water consumption
Apple	1 kg	822 litres
Banana	1 kg	790 litres
Beef	1 kg	15,415 litres
Beer	1 × 250ml glass	74 litres
Bio-diesel	1 litre	11,397 litres
Bread	1 kg	1,608 litres
Butter	1 kg	5,553 litres
Cabbage	1 kg	237 litres
Cheese	1 kg	3,178 litres
Chicken meat	1 kg	4,325 litres
Chocolate	1 kg	17,196 litres
Egg	1	196 litres
Milk	1 × 250ml glass	255 litres
Olives	1 kg	3,025 litres
Pasta (dry)	1 kg	1,849 litres
Pizza	1 unit	1,239 litres
Pork	1 kg	5,988 litres
Potatoes	1 kg	287 litres
Rice	1 kg	2,497 litres
Sheep Meat	1 kg	10,412 litres
Tea	1 × 250 ml cup	27 litres
Tomato	1 kg	214 litres
Wine	1 x 250ml glass	109 litres
Cotton	1 @ 250g	2,495 litres

Figure 19: Table provided by News24 that shows the typical values for the volumes of water required to produce common food stuffs (Wallace, 2018).

Boshoff provides an in-depth rebuttal of the aforementioned video (https://www.youtube.com/watch?v=X_OEScmCK2w), which is printed in full on GroundUp:

> A farmer doesn't use x amount of water to put food on your table. The entire value chain does. I am not sure why they included coffee and chocolate as examples in the video, because South Africa neither produces coffee nor cocoa beans… South Africa is ranked first on the Dupont Food Security Index's list of food security countries in Africa. Internationally, we were placed 44th last year, a phenomenal achievement and an improvement of three places despite the drought and despite producers' water supply being curtailed by between 60%

> and 87%, and even 100% in some areas. The only people who can get credit for this are our farmers and our farm workers, (GroundUp, 2018).

On 19 January 2018, News24 published the story 'ANC WC to request inquiry into whether City 'deliberately ignored' drought warnings'. The story leads with how the ANC "said it would request President Jacob Zuma to institute a Commission of Inquiry to establish whether the Western Cape government and the City of Cape Town 'deliberately ignored the warnings of the diminishing water resources'" (Petersen, 2018). Petersen (2018) then quotes ANC Western Cape secretary Faiez Jacobs: "The DA must accept the blame for dumping the city in this crisis that will impact all its residents and especially the poor, who will find it difficult to get to the collection points when Day Zero arrives." The story has an overall negative theme and the main frame throughout is 'DA versus ANC'. Jacobs adds: "This civil war in the DA is having negative implications for citizens; engaging in racialised factionalism, surveillance on each other, corrupt practices, et cetera, took [their] eye off governance resulting in service delivery failure and this water crisis," (Petersen, 2018). Jacobs is referring to the internal conflict between De Lille and other DA members who allege she is involved in corruption: "De Lille, who is at the centre of a series of corruption allegations, at a press briefing on the water crisis on Thursday avoided a question on whether she would voluntarily hand over management of the City's drought crisis to Deputy Mayor Ian Neilson and mayoral committee member for water Xanthea Limberg, as requested by the Democratic Alliance's federal executive on Sunday," (Petersen, 2018). This brings the frame 'DA versus DA' into the story. This is the only story in the sample of News24 articles in which Jacobs is quoted.

In 'Zille on SA Weather Service: I did not blame them for getting rainfall wrong' (27/01/18), Chabalala (2018) leads with how Zille "says the South African Weather Service (SAWS) should not deny its predictions regarding rainfall in the province". According to Zille, the SAWS said that their "models don't work anymore in an era of climate change" (Chabalala, 2018). In her defense, Zille tweeted a picture of the service's prediction for winter 2017, which forecasted normal rainfall, arguing that "they shouldn't try to deny what they predicted," (Chabalala, 2018).

Figure 20: Image showing Premier Helen Zille's tweet about the SAWS' winter rainfall prediction (Chabalala, 2018).

According to Chabalala (2018), Zille also said that "climate change projections were to have hit us in 2025, they came 10 years before that, this is very real and very challenging and we all need to pull together when the experts can't predict anything anymore". However, the SAWS "hit back" at the premier, stating that her remarks are "disingenuous and extremely opportunistic coming as it does in the midst of a water crisis" (Chabalala, 2018). Furthermore, the SAWS add:

> The Premier must appreciate that she is not a Meteorologist nor a Scientist, therefore we would be interested to know who her sources on climate change and the role of weather services are… Blaming the weather, or climate and the Weather Service is a cop-out for policy inaction and ineptitude in implementation of multidisciplinary research and reports that have long pointed to the water challenge in the country, the Western Cape and in Cape Town, (Chabalala, 2018).

This brings into question the management abilities of the DA to effectively deal with the drought. It also sends mixed messages to readers about what information to listen to and trust. The story concludes with Mokonyane (recorded twice in sample of News24 coverage) urging "provincial government to take responsibility in dealing with the water crisis, rather than blame the national government" (Chabalala, 2018). According to Chabalala (2018), Mokonyane was reacting to comments made by Maimane and Zille who said the responsibility for bulk water supply lay her with ministry.

Table 15: Top sources quoted in sample of News24 drought coverage.

Name	Title	Number of references in coverage
Xanthea Limberg	Mayoral Committee member for informal settlements, water and waste services and energy	6
Patricia De Lille	Mayor of Cape Town	4
Ian Neilson	Cape Town deputy mayor	3
Nomvula Mokonyane	Minister of Department of Water and Sanitation	2
Sputnik Ratau	Department of Water and Sanitation spokesperson	2
Anton Bredell	Local government Member of the Executive Council	2
Helen Zille	Western Cape premier	2

On 30 January 2018, News24 published 'Managers focused on furniture needs, not water – De Lille on Cape Town's 'derailed' drought plan' which focuses on how De Lille is unhappy with how members of her own party and management team are dealing with the drought. There is a negative theme to this story with the frames 'unhappiness with drought management' and 'DA versus DA' being prevalent in the lead of the story. According to De Lille, COCT project managers "tasked with coming up with solutions about the drought spent lots of time talking about furniture they wanted instead of water projects" (Dolley, 2018). De Lille adds:

> 'At some of the very first meetings it was astounding to hear feedback from project managers who, when asked for updates on the plans to get additional water, instead spent a great deal of time talking about furniture for the 'war room' for the resilience team… Instead of receiving substantial feedback on the actual delivery of water and commencement of projects, senior project managers spoke about desks and other office furniture… and the costs to set it up' (Dolley, 2018).

In her submission, De Lille also claims that last year, when Cape Town's water situation needed urgent tackling, some City officials didn't believe there was a crisis and didn't realise climate change was a contributing factor. According to De Lille, by the end of October 2017, the water resilience plan created months earlier was not actually moving ahead:

> 'It was apparent that the plan had veered off course and the commitment of the second date in October for 'new water' to come online would not come to fruition,' De Lille wrote. 'It was incumbent on me to step into the management of the water crisis even more hands

> on and more frequently.' This means just three months ago the City was still not on top of the pending crisis, (Dolley, 2018).

There are three prevalent frames here, namely: 'A lack of people with expertise in water management responsible for dealing with the drought' (recorded twice); 'misinformation and lack of education surrounding drought' (recorded once in News24 sample); and 'mixed messages regarding drought' (recorded once). The latter is encompassed by the fact that, for the better part of 2017, the City had been assuring residents that they were doing everything in their power to remedy Cape Town's water scarcity:

> The City is in the process of bringing forward several emergency supply schemes. This includes the Table Mountain Group Aquifer, a small-scale desalination plant, intensifying the City's pressure management and water demand management programmes, and a R120 million small-scale wastewater reuse plant at the Zandvliet water treatment works which will be capable of producing 10 million litres of high quality drinking water per day to the central and southern suburbs of Cape Town, (COCT, 2017).

The aforementioned submission by De Lille was addressed to the DA's federal executive chairperson and titled 'Reasons why Patricia de Lille should not resign from her position as executive mayor of the City of Cape Town and reasons why the Democratic Alliance ought not to move a motion of no confidence against her'. De Lille also stated that in February 2017 she applied to national government to declare that City a local disaster area because "the situation was so concerning" (Dolley, 2018). This application was approved and De Lille is quoted blaming national government for not providing the necessary contingency measures to deal with the drought: "Had the disaster declaration been approved, we would have been provided with the legal mechanism to enable the City to move budget from one purpose to another, as well as had access to emergency funding," (Dolley, 2018). This accusation is somewhat misplaced since, as De Lille herself admitted, the DA responsible for managing the water crisis wasn't taking its severity seriously.

One of the more technical articles published by News24 was titled ''Composting toilets' and 'Day Zero' dominate Cape Town Google searches' and appeared on 2 February 2018: "'Composting toilet' became a 'breakout' topic on Google Trends, meaning the search topic grew by over 5000%...

The topic ‘cape town day zero’ also saw a 200% surge in searches in the past 90 days” (Venktess, 2018). According to Venktess (2018), “Google Trends numbers represent search interest relative to the highest point on the chart for the given region and time”, adding that “a value of 100 is the peak popularity for the term and a value of 50 means that the term is half as popular”. Venktess (2018) also refers to data from the product comparison website PriceCheck, which shows how Capetonians are scrambling to get bottled water and Jojo tanks:

> PriceCheck reported a 577% increase in searches for ‘bottled water’ since December in anticipation of Day Zero, set for April 16. It said that ‘JoJo tanks’ are one of the most searched for items across the site. PriceCheck data also showed that ‘artificial grass’ is among the five most searched for products on the site.

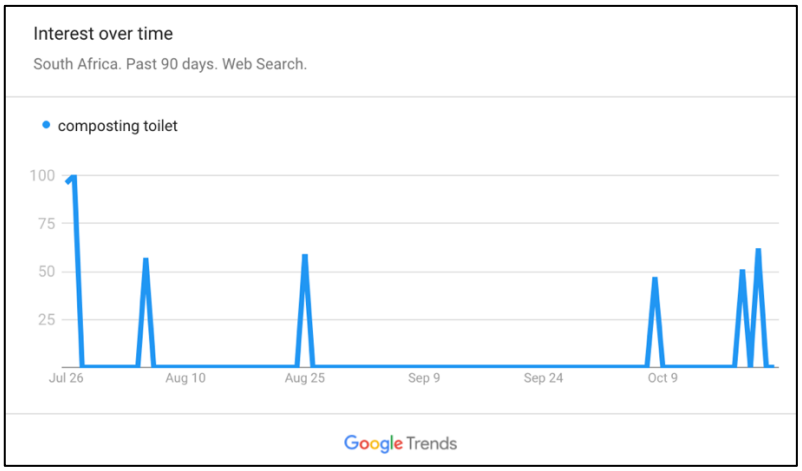

Figure 21: Graph showing interest over time in Google Trends for the search term ‘composting toilet’ (Venktess, 2018).

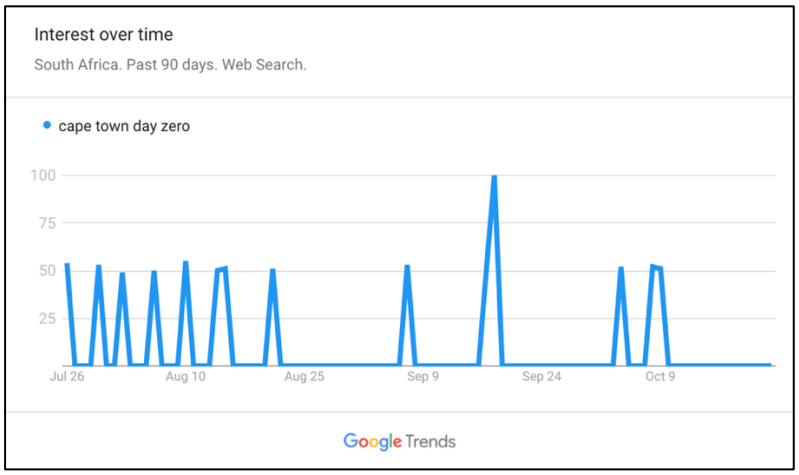

Figure 22: Graph showing interest over time in Google Trends for the search term ‘cape town day zero’ (Venktess, 2018).

On 11 February 2018, News24 published the article 'No end in sight for dry spell' and Brown (2018) opens by quoting Hannes Rautenbach, chief scientist for climate change and variability at the SAWS:

> 'It is unclear for how much longer the drought in Cape Town and surrounding areas is going to last, but history shows that dry spells in the city have persisted for as long as 15 years. The weather records, which stretch back to 1921, show that Cape Town and surrounds experienced a dry spell of below normal rainfall from 1924 to 1939. The last time Cape Town experienced three consecutive years of below normal rainfall was from 1971 to 1973.'

Rautenbach adds: "In 2015, 549 millimetres of rain was recorded, making it the second-driest year since 1921; in 2016, the region received 634mm of rain, making it the 14th-driest year since 1921; and there were 499mm last year – the driest year since 1921. This compares with average annual rainfall of 820mm since 1921," (Brown, 2018).

In 'Cape farmers lose 25% of orchards, vineyards as a result of drought - expert', Gosling (2018a) leads with how "drought-stricken farmers in the Western Cape have had to abandon at least a quarter of their high-value vineyards and deciduous fruit orchards because of a lack of water for irrigation". This aligns with the frame 'agricultural losses due to drought' which was recorded once in the News24 drought coverage sample. According to UCT professor Mark New, director of UCT's African Climate and Development Initiative, this loss in vegetation "has had a knock-on effect on rural employment, with the loss of about 30 000 seasonal farm worker jobs during the harvest season" which will "have a long-term impact on the agricultural sector, a major export industry in the region" (Gosling, 2018a). Gosling (2018a) adds how New spoke of a "perfect storm" of conditions leading to Cape Town's water crisis. New explains:

> 'Demand had increased and [DWS] had been incredibly reluctant to bring on additional water supplies in the Western Cape. This was because many other provinces had bigger demands in terms of water supply and sanitation. So, you can understand to some extent where the priorities of the national department lie, but it meant a delay, with the impending water scarcity looming in the background. Also, [DWS] was a very poorly run department that had run out of money, partly through wasting it and partly because of inefficiency. In addition, the

> [COCT's] water managers had been rather complacent during 2017 and had thought the city would not get a third dry year, (Gosling, 2018a).

New adds that "the narrative in the city was this was a one-in-a-400-year drought, so the chances were very, very slim to get another dry year. It shows they don't understand probability at all" (Gosling, 2018a). The narrative around the drought then changed when De Lille decided to act by setting up a drought crisis committee, however, although this "really changed momentum", Cape Town was hit by a political crisis where the mayor was accused of corruption by a colleague:

> This effectively meant there was political gridlock for about three months from October, November to December, while the ruling party was trying to get rid of the mayor. No decisions were made so all the technical managers, who were trying to install desalination plants, could not get permission to go ahead with getting the projects going, (Gosling, 2018a).

New argues that Cape Town managed to "dodge the bullet" of Day Zero this year due to agricultural cuts, water donations from farmers, and the huge drop in consumption by Capetonians (Gosling, 2018a).

On 29 March 2018, News24 published 'South Africa could run out of water by 2030 – govt draft plan', where Gosling (2018b) states that according to the draft National Water and Sanitation Plan, "South Africa will run out of water in 2030 unless there is a complete mind shift about the true value of water and a R899bn investment into the sector for the next decade". This encapsulates how the drought is a serious issue (recorded nine times in News24 drought coverage sample). As cited by Gosling (2018b), the plan states:

> South Africa is currently investing in water and sanitation infrastructure, but this is not nearly enough to address the massive backlog in getting new infrastructure built and refurbishing the old. To make sure the country does not run out of water, the total estimated capital investment requirement was R899bn a year – R33bn a year more than was currently being spent, leaving a 37% funding gap. The only way to get funds was from taxes and tariffs… The new reality [is

> that] water will become more expensive. Everyone except the indigent, must pay for water and sanitation. Everyone, except those without access to piped water, must use less water.

According to Gosling (2018b), the plan also outlined "the serious situation in many municipalities, where staff running water treatment or sewerage works did not have the necessary skills or training". Gosling (2018b) concludes by providing the findings in the draft National Water and Sanitation Plan with regards to South Africa's average domestic water consumption:

> [Although] Capetonians have cut water consumption enormously, South Africa's average domestic water consumption is 237 litres [per] person [per] day, above the world average of 173 litres [per] person [per] day. This figure is inflated because it includes all the water wasted through leaks and because of people not paying their bills, [known as] "nonrevenue" water. [This] stands at an "unacceptably high" 41% in South African municipalities, of which an estimated 35% is due to physical losses of water. If the country's demand continues to grow at current levels, and we continue with a "business as usual" scenario and take no action, the deficit between water supply and demand would be a gap of about 17% by 2030.

The most prevalent frames in News24's drought coverage was 'citizens must conserve water' and 'drought is a serious issue'. Several stories overlap from these two groups, namely: 'Drought-weary Western Cape residents warned to prepare for floods' (19/04/17); 'Cape Town water usage must come down by 100 million litres – city' (22/05/17); 'City of Cape Town prays for much needed rain' (25/05/17); and 'Drought declared a national disaster' (13/03/18).

In 'Drought-weary Western Cape residents warned to prepare for floods', Bredell warns Western Cape residents to "start preparing for possible flooding when the winter rains arrive to break the drought" (Evans, 2017). Evans (2017) later adds: "In the meantime, water must still be used sparingly… The drought has been declared a disaster." This encapsulates the aforementioned frames. 'Cape Town water usage must come down by 100 million litres' reminds citizens that more needs to be done to save water (citizens must conserve water). According to Limberg: "Consumption disappointingly remains at 93 million litres above the consumption target of 600 million litres (per

day),” (Khoza, 2017a). Zille, as cited by Khoza (2017a), is also quoted officially declaring the “drought-stricken Western Cape a disaster area” (drought is a serious issue). The article ‘City of Cape Town prays for much needed rain’ details how De Lille “hosted an inter-faith prayer gathering on Table Mountain to pray for much needed rain” (Khoza, 2017b). Ironically, De Lille is quoted two lines later stating that the city “had experienced a below annual average rainfall and the province was feeling the harsh impacts of climate change” (Khoza, 2017b). Khoza (2017b) also explains that “the Western Cape is experiencing the worst drought in more than 100 years” (drought is a serious issue), and quotes De Lille asking citizens to conserve water: “We are now asking all residents to bring their water consumption down to 100 litres per person, per day.” In ‘Drought declared a national disaster’, Herman (2018) leads with how “Cooperative Governance and Traditional Affairs Minister Zweli Mkhize has declared the prevailing water crisis affecting multiple provinces a national state disaster” (drought is a serious issue). As cited by Herman (2018), Mkhize also called on “all citizens to continue to save water and change behaviour, as South Africa is currently a water scarce country” (citizens must conserve water).

Chapter 7 – Conclusion

7.1. Summary

Beliefs about climate change (natural or human-caused) are largely influenced by information people receive from their environment, including the media. Previous knowledge, attitudes and understanding about an issue influences the way this information is processed, impacting whether or not the necessary reasoning steps will be implemented. This becomes even more problematic when readers are faced with conflicting information because it diminishes trust in both those relaying the information and the information being communicated. This is detrimental in times when great consensus is needed in order to drive a massive behavioural shift, such as during the Western Cape's water crisis.

Framing by messengers such as the media can have a significant effect on how people perceive and understand different events, thereby influencing positive or negative behaviour. How salient an issue becomes in the public sphere is determined by how many times the issue in question is brought to the public's attention (known as agenda-setting). The *Cape Argus* only had 281 stories concerning the drought out of a possible 7 159 for the time period of the study (only 3,93% of all articles documented the water crisis); *Die Burger* had 287 out of a possible 8 808 (3,26%); and the *Cape Times* had 188 out of a possible 6 793 (2,77%). This illustrates that the saliency of the drought on the print media agenda in the Western Cape was poor in comparison to the volume of other stories.

Journalistic norms and values determine which events become news stories and these processes set the agenda for climate issues. Framing is also influenced by this process due to the newsroom pressures of having to produce fresh, entertaining content that will appeal to readers. In a number of instances, personalisation is used by journalists to garner interest in audiences as it often emphasises competition between personalities thereby pushing the conflict frame which dramatises news events. Unfortunately, this process tends to distract readers from a more in-depth analysis and understanding of climate issues. There was a strong DA/ANC conflict frame present in the *Cape Argus*, the *Cape Times* and News24. This conflict frame was also present in *Die Burger* and GroundUp but was not recorded as frequently as in the other publications in the study.

Journalists also often contact a number of sources when compiling stories; however, this can have a negative impact when the comment provided goes against information that has otherwise been proven true. This diminishes the severity of the situation by distracting readers from the issue at hand. This was seen in GroundUp when citizens were quoted stating that the City was trying to instil fear

by making up Day Zero so that water could be privatised, and in News24 when a journalist spread fake news with regards to water and farming.

Climate issues have been defined as both an environmental and social problem. Framing defines how a social problem will develop by selecting specific interpretations of reality from a plurality of possibilities. The top three media frames (respectively) documented in each publication were as follows:

- *Cape Argus* – Water consumption still too high; DA versus ANC; and warning of increased water restrictions.
- *Die Burger* – Drought is a serious issue; measures the City is undertaking to curtail water usage/improve drought conditions; and water consumption still too high.
- *Cape Times* – Water consumption still too high; measures the City is undertaking to curtail water usage/improve drought conditions; and citizens must conserve water.
- GroundUp – Unhappiness with drought management; measures the City is undertaking to curtail water usage/improve drought conditions; and COCT's drought communication has been inadequate.
- News24 – Citizens must conserve water; drought is a serious issue; and warning of increased water restrictions.

The aforementioned frames were provided most routinely to readers, arguably defining how the drought was processed and understood. Unfortunately, the political narrative hypothesised as being prevalent throughout the drought coverage of the five publications in this study rung true for four (*Cape Argus, Cape Times, Die Burger* and News24). This is clearly illustrated when looking at which frames were used most throughout the coverage, as well as by looking at which sources journalists favoured in acquiring comment. GroundUp had a more robust scientific narrative, concentrating on aspects such as the impacts of increased bottled water consumption; information on how Day Zero is calculated; aspects determining the location of water collection points; historic data on rainfall, dam levels and water consumption; new ways of saving water in informal settlements; and how to collect and store storm water in aquifers, among others. This being said, GroundUp's coverage was not faultless and did take longer to read and conceptualise which might be an issue for people who don't have a lot of time to read and process in-depth news articles.

7.2. Recommendations

Further research in the form of audience analysis should be conducted in order to ascertain just how much audiences were influenced to change their water consumption habits as a result of each publication's drought coverage, as well as how much each publication increased/influenced understanding of the drought. Further research could also be conducted by focusing on the journalists and editors behind the stories to determine how personal knowledge and attitudes influenced framing practices within the publication. It is clear that South Africa is still in need of print and online publications that concentrate on issues of science, taking time to extensively explore aspects such as the environment, medicine, physics, chemistry and biology, to name a few. Without this, society will surely miss out on an important understanding of the world they live in and how it is impacted by different behaviours.

List of references

Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., Naess, L-O., Wolf, J. & Wreford, A. 2009. Are There Social Limits to Adaptation to Climate Change? *Climatic Change,* 93:335–354.

Adriaanse, D., Isaacs, L., Booysen, C. & African News Agency. 2018. 'We will supply water to Cape Town'. *Cape Times*, 23 February:1.

ANA reporter. 2017. Cape Town gets even tougher on water restrictions. *IOL*, 26 January. Available: https://www.iol.co.za/news/south-africa/western-cape/cape-town-gets-even-tougher-on-water-restrictions-7512713. [5 May 2018].

Baigrie, B. 2017. This water crisis won't be Cape Town's last. *GroundUp,* 17 February. Available: https://www.groundup.org.za/article/water-crisis-wont-be-cape-towns-last/. [10 August 2018].

Barnard, M. & De Lille, P. 2017a. Kaap het 100 dae se water oor. *Die Burger*, 14 February:1.

Barnard, M. & De Lille, P. 2017b. Beplan vir 'permanente droogte'. *Die Burger*, 3 July:1.

Barnard, M. 2017a. Damme kwyn nou tot onder 40%. *Die Burger*, 24 January:1.

Barnard, M. 2017b. Katspoegie meer water in WesKaapse damme ná onlangse reën. *Die Burger*, 8 August:1.

Barnard, M. 2017c. Oorlog oor water dreig in die Kaap. *Die Burger*, 12 October:1.

Barnard, M. 2018a. Dag Zero: Nóg skokke vir Kaap. *Die Burger*, 19 January:1.

Barnard, M. 2018b. Politieke bakleiery wyl krane leeg raak. *Die Burger*, 24 January:1.

Barnard, M. 2018c. Mmusi kap stad oor waterplan. *Die Burger*, 25 January:1.

Bennett, W.L. 2002. *News: The politics of illusion*. New York: Longman.

Blumer, H. 1971. Social Problems as Collective Behaviour. *Social Problems,* 18:298-306.

Blumler, J. G. & Gurevitch, M. 1995. *The crisis of public communication*. London: Routledge.

Boykoff, M.T. & Smith, J. 2010. Media presentations of climate change. In: Lever-Tracy C. Ed. 2010. *Routledge handbook of Climate Change and Society*. Oxon: Routledge, 210–218.

Boykoff, M.T. 2011. *Who speaks for the climate? Making sense of media reporting on climate change*. New York: Cambridge University Press.

Brits, E. 2018. Waarskuwings oor droogte gaan so ver terug as 2007. *Die Burger.* 23 January:4.

Brown, P.R.B. 2009. Competition and getting past the boss: Role of media in contributing in combating climate change oral presentation. *IOP Conference Series: Earth and Environmental Science,* 6 (2009).

Brüggemann, M. 2014. Between frame setting and frame sending: How journalists contribute to news frames. *Communication Theory,* 24 (1):61–82.

Bubela, T., Nisbet, M.C., Borchelt, R., Brunger, F., Critchley, C., Einsiedel, E., Geller, G., Gupta, A., Hampel, J., Lay, R.H., Jandciu, E.W., Jones, S.A., Kolopack, P., Lane, S., Lougheed, T., Nerlich, B., Ogbogu, U., O'Riordan, K., Ouellette, C., Spear, M., Strauss, S., Thavaratnam, T., Willemse, L. & Caulfield, T. 2009. Science communication reconsidered. *Nature Biotechnology,* 27(6):514-518.

Bucchi, M. & Trench, B. 2014. *Routledge handbook of public communication of science and technology*. 2nd ed. Oxon: Routledge.

Cambridge Dictionary. 2018. 'In dire straits'. *Cambridge Dictionary*. Available: https://dictionary.cambridge.org/dictionary/english/in-dire-straits. [10 August 2018].

Chabalala, J. 2018. Zille on SA Weather Service: I did not blame them for getting rainfall wrong. *News24*, 27 January. Available: https://www.news24.com/SouthAfrica/News/zille-on-sa-weather-service-i-did-not-blame-them-for-getting-rainfall-wrong-20180127. [10 August 2018].

Charles, M. 2017. Water restrictions now raised to level 5. *Cape Argus*, 4 September:1.

Charles, M. 2018. Cape sport takes a knock due to drought. *Cape Argus*, 21 February:1.

COCT. 2017. Drought crisis: City working to bring emergency schemes online. *City of Cape Town*, 3 April. Available: http://www.capetown.gov.za/Media-and-news/Drought%20crisis%20City%20working%20to%20bring%20emergency%20schemes%20online. [10 August 2018].

Cohen, B.C. 1963. *The press and foreign policy*. New Jersey: Princeton.

Conradie, W.S. 2018. Why is Cape Town running out of water? *Climate System Analysis Group*, 21 February. Available: http://www.csag.uct.ac.za/2018/02/21/cape-town-running-out-of-water/. [17 June 2018].

Daniels, N. 2017. 51000 water 'clamps'. *Cape Times*, 26 September:1.

Davies, N. 2008. *Flat Earth News: An award-winning reporter exposes falsehood, distortion and propaganda in the global media*. London: Vintage.

Dolley, C. 2018. Managers focused on furniture needs, not water – De Lille on Cape Town's 'derailed' drought plan. *News24,* 30 January. Available: https://www.news24.com/SouthAfrica/News/managers-focused-on-furniture-needs-not-water-de-lille-on-cape-towns-derailed-drought-plan-20180130. [10 August 2018].

Du Plooy, G.M. 2009. *Communication research: Techniques, methods and applications*. 2nd ed. Cape Town: Juta & Co.

Dunwoody, S. 2011. Science communication. *Oxford Bibliographies*, 23 February. Available: http://www.oxfordbibliographies.com/view/document/obo-9780199756841/obo-9780199756841-0031.xml. [5 April 2018].

Engineering News. 2018. Mokonyane lambasted for 'collapsing' water dept: Scopa decries reshuffling and calls for charges. *Engineering News,* 27 February. Available: http://www.engineeringnews.co.za/article/mokonyane-lambasted-for-collapsing-water-dept-scopa-decries-reshuffling-and-calls-for-charges-2018-02-27/rep_id:4136. [10 August 2018].

Entman, R.M. & Rojecki, A. 1993. Freezing Out the Public: Elite and Media Framing of the U.S. Anti-Nuclear Movement. *Political Communication,* 10: 155-173.

Entman, R.M. 1989. *Democracy without citizens: media and the decay of American politics*. Oxford: Oxford University Press.

Entman, R.M. 1991. Framing U.S. coverage of international news: Contrasts in narratives of the KAL and Iran air incidents. *Journal of communication*, 41(4):6-27.

Entman, R.M. 1993. Framing: Toward clarification of a fractured paradigm. *Journal of communication*, 43(4). 51-58.

Essop, P. 2017. Droogtenood in Kaap kry R75m. *Die Burger*, 30 August:1.

Evans, J. 2017a. Cape Town threatens to ban watering of gardens. *News24*, 4 January. Available: https://www.news24.com/SouthAfrica/News/cape-town-threatens-to-ban-watering-of-gardens-20170104. [10 August 2018].

Evans, J. 2017b. Drought-weary Western Cape residents warned to prepare for floods. *News24*, 19 April. Available: https://www.news24.com/SouthAfrica/News/drought-weary-western-cape-residents-warned-to-prepare-for-floods-20170419. [10 August 2018].

Felix, J. & May, A. 2018. Water war spills into the streets. *Cape Argus*, 17 January:1.

Felix, J. & Mkentane, L. 2018. Heavy price as Day Zero delayed. *Cape Argus*, 6 February:1.

Felix, J. 2017. Water vir net 100 dae oor in Kaapstad. *Die Burger*, 4 April:1.

Felix, J. 2018a. R6bn for drought relief 'not enough'. *Cape Argus*: 23 February:1.

Felix, J. 2018b. Just like our dams, the department's funds dried up. *Cape Argus*, 28 February:1.

Felix, J. 2018c. Government takes charge of water crisis. *Cape Argus*, 9 February:1.

Gamson, W. 1992. *Talking Politics*. Cambridge: Cambridge University Press.

Gamson, W.A. & Modigliani, A. 1987. The changing culture of affirmative action. In: Braungart, R.G. & Braungart, M.M. Eds. 1987. *Research in political sociology*, 3:137-177. Connecticut: JAI Press.

Gamson, W.A. & Modigliani, A. 1989. Media discourse and public opinion on nuclear power: A constructionist approach. *American Journal of Sociology*, 95:1-37.

Gans, H. 1979. *Deciding What's News*. New York: Pantheon.

Gastrow, M. 2015. The stars in our eyes: Representations of the Square Kilometre Array telescope in the South African media. Unpublished PhD research dissertation, Stellenbosch: Stellenbosch University.

Gitlin, T. 1980. *The Whole World Is Watching: Mass Media in the Making and Unmaking of the New Left*. Berkeley: University of California Press.

Goffman, E. 1974. *Frame Analysis: An Essay of the Organization of Experience*. New York: Harper & Row.

Gosling, M. 2018a. Cape farmers lose 25% of orchards, vineyards as result of drought – expert. *News24*, 22 March. Available: https://www.news24.com/SouthAfrica/News/cape-farmers-lose-25-of-orchards-vineyards-as-result-of-drought-expert-20180322. [10 August 2018].

Gosling, M. 2018b. South Africa could run out of water by 2030 – govt draft plan. *News24,* 29 March. Available: https://www.news24.com/SouthAfrica/News/south-africa-could-run-out-of-water-by-2030-govt-draft-plan-20180329. [10 August 2018].

Grimes, D.R. 2016. Impartial journalism is laudable. But false balance is dangerous. *The Guardian*, 8 November. Available: https://www.theguardian.com/science/blog/2016/nov/08/impartial-journalism-is-laudable-but-false-balance-is-dangerous. [5 April 2018].

GroundUp, 2018. Facts and myths about Cape Town's water crisis. *GroundUp*, 18 January. Available: https://www.groundup.org.za/article/facts-and-myths-about-cape-towns-water-crisis/. [17 June 2018].

Grundmann, R. 2016. Climate Change as a wicked social problem. *Nature Geoscience*, 9, 562-3.

Head, T. 2018. Level 6B water restrictions have started: Here's what they mean for Cape Town. *The South African*,1 February. Available: https://www.thesouthafrican.com/level-6b-water-restrictions-cape-town/. [5 February 2018].

Hendricks, A. 2018. Hundreds protest against City over water crisis. *GroundUp*, 29 January. Available: https://www.groundup.org.za/article/hundreds-protest-against-city-over-water-crisis/. [10 August 2018].

Herman, P. 2018. Drought declared a national disaster. *News24*, 13 March. Available: https://www.news24.com/SouthAfrica/News/breaking-drought-declared-a-national-disaster-20180313. [17 June 2018].

Herman, P. 2018. Drought declared a national disaster. *News24,* 13 March. Available: https://www.news24.com/SouthAfrica/News/breaking-drought-declared-a-national-disaster-20180313. [10 August 2018].

Hilgartner, S. & Bosk, C.L. 1988. The rise and fall of social problems: A public arenas model. *American Journal of Sociology*, 94:53-78.

Hulme, M. 2009. *Why we disagree about climate change: Understanding controversy, inaction, and opportunity*. Cambridge: Cambridge University Press.

International Panel on Climate Change. 2013. *Climate Change 2013: The Physical Science Basis*. (Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change). T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, & P. M. Midgley. Eds. 2013. New York: Cambridge University Press.

Isaacs, L. 2017a. With dam levels at 42.5%, City urges residents to save water. *Cape Times*, 17 January:1.

Isaacs, L. 2017b. Water shortage: 'It's a very grim picture'. *Cape Times*, 17 May:1.

Isaacs, L. 2017c. I see a tap, but do I have to open it? *Cape Times*, 23 October:1.

Isaacs, L. 2017d. Devices to cut water use installed, but below target. *Cape Times*, 11 October:1.

Isaacs, L. 2017e. Water plans behind schedule. *Cape Times*, 13 December:1.

Isaacs, L. 2018a. Zero Day Zero. *Cape Times*, 8 March:1.

Isaacs, L. 2018b. Day Zero: Plans had to begin years ago. *Cape Times*, 1 February:1.

Iyengar, S., & Kinder, D.R. 1987. *News that matters: Television and American opinion*. Chicago: University of Chicago Press.

Janse van Rensburg, A. 2010. The Struggle for Livelihood: How Social and Cultural Factors Affect the Way South African Audiences Understand Climate Change. *Global Media Journal: African Edition*, 10 (1).

Johnson, R.B. and Christensen, L.B. 2014. *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. 5th ed. California: Sage.

Johnston, P. & Wolski, P. 2018. Will there be more rain this winter? *GroundUp*, 15 March. Available: https://www.groundup.org.za/article/will-there-be-more-rain-winter/. [10 August 2018].

Khoza, A. 2017. City of Cape Town prays for much needed rain. *News24*, 25 May. Available: https://www.news24.com/SouthAfrica/News/city-of-cape-town-prays-for-much-needed-rain-20170525. [10 August 2018].

Kinder, D.R. & Sanders, L.M. 1990. Mimicking political debate with survey questions: The case of white opinion on affirmative action for blacks. *Social Cognition*, 8:73-103.

Kinder, D.R. 1983. Diversity and complexity in American public opinion. In: Finifter, A.W. Ed. 1983. *Political science: The state of the discipline,* 389-425. Washington, DC: American Political Science Association.

Krosnick, J. A., Holbrook, A. L., Lowe, L. & Visser, P. S. 2006. The origins and consequences of democratic citizens' policy agendas: A study of popular concern about global warming. *Climatic Change, 77*(1-2):7-43.

Kruger, J. 2018. Nuwe jaar bring reën én waterbeperkings vir Kaapstad. *Die Burger*, 2 January:1.

Küsel, A., & Prince, L. 2018. Minister wil nie byt aan Dag Zero. *Die Burger*, 29 January:1.

Maqhina, M. 2018. Hope for water dashed. *Cape Times*, 22 February:1.

McCombs, M.E., & Shaw, D.L. 1972. The agenda-setting function of mass media. *The Public Opinion Quarterly*, 36(2):176-187.

McCombs, M.E., Llamas, J.P., Lopez-Escobar, E. & Rey, F. 1997. Candidate images in Spanish elections: Second-level agenda-setting effects. *Journalism & Mass Communication Quarterly*, 74:703-717.

McCright, A.M. & Dunlap, R.E. 2003. Defeating Kyoto: The conservative movement's impact on U.S. climate change policy. *Social Problems*, 50(3):348-373.

McQuail, D. 1994. *Mass communication theory: An introduction* (3rd edition). California: Sage.

Merten, M. 2018. Analysis: A drought of nature compounded by a drought in leadership. *Daily Maverick*, 22 January. Available: https://www.dailymaverick.co.za/article/2018-01-22-analysis-a-drought-of-nature-compounded-by-a-drought-in-leadership/#.WyuEyFOFOfU. [17 June 2018].

Meyer, W. 2018. Polisie hou ook wag oor water. *Die Burger*, 23 April:1.

Muller, M. 2017. Understanding the origins of Cape Town's water crisis. *Civil Engineering*, 11-16.

Muller, M. 2018. Decolonising engineering in South Africa – Experience to date and some emerging challenges. *South African Journal of Science,* 114(5/6):5-10.

Mulligan, G. 2018. Will Cape Town be the first city to run out of water? *BBC,* 12 January. Available: https://www.bbc.com/news/business-42626790. [5 August 2018].

NASA. 2005. What's the difference between weather and climate? *National Aeronautics and Space Administration*, 1 February. Available: https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html. [3 April 2018].

National Academies of Sciences, Engineering and Medicine. 2017. *Communicating science effectively: A research agenda*. Washington DC: The National Academies Press.

Neille, D., Van der Merwe, M., & Dougan, L. 2017. Cape of storms to come: Welcome to the new normal. *Daily Maverick*. Available: http://features.dailymaverick.co.za/cape-of-storms-to-come/cape-of-storms-to-come-part-1.html. [17 June 2018].

Nelson, T.E., Clawson, R.A., & Oxley, Z.M. 1997. Media framing of a civil liberties conflict and its effect on tolerance. *American Political Science Review*, 91:567-583.

Neuman, R.W., Just, M.R. & Crigler, A.N. 1992. *Common knowledge: News and the construction of political meaning*. Chicago: University of Chicago Press.

Nicholson, A. 2017. Cape Town's water crisis: Can suburbia save the day? *UCT News*, 27 September. Available: https://www.news.uct.ac.za/news/cape-town-water-crisis/-article/2017-09-27-cape-towns-water-crisis-can-suburbia-save-the-daya. [10 August 2018].

Nienaber, 2018b. Kaapstad kán Dag Zero afweer, sê Maimane. *Die Burger*, 31 January:1.

Nienaber, M. 2017a. Damvlakke styg effe danksy reën. *Die Burger*, 13 June:1.

Nienaber, M. 2017b. Damvlakke in WesKaap daal steeds ondanks reën. *Die Burger*, 7 November:1.

Nienaber, M. 2018a. Só lyk Kaap se nuwe waterplan. *Die Burger*, 10 January:1.

Nienaber, M., & De Wee, M. 2018. Dag Zero 'is nou nóg nader'. *Die Burger*, 23 January:1.

Nisbet, M.C. 2009. Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development,* 51(2):12-23.

Nisbet, M.C. 2010. Knowledge into action: Framing the debate over climate change and poverty. In: D'Angelo, P. & Kuypers J.A. Eds. 2010. *Doing News Framing Analysis*. New York: Routledge.

Nkalane, M. 2017. Water restrictions tightened. *Cape Times*, 27 January:1.

Olivier, D.W. 2017. Cape Town's water crisis: driven by politics more than drought. *News24*, 14 December. Available: https://www.news24.com/Analysis/cape-towns-water-crisis-driven-by-politics-more-than-drought-20171214. [5 February 2018].

Pan, Z., & Kosicki, G.M. 1993. Framing analysis: An approach to new discourse. *Political Communication*, 10:55-75.

Payi, B. 2017. Level 4b water restrictions enacted in Cape Town. *IOL*, 2 July. Available: https://www.iol.co.za/news/south-africa/western-cape/level-4b-water-restrictions-enacted-in-cape-town-10095498. [5 August 2018].

Payne, S. 2018. What national government is doing about Cape Town's water crisis. *GroundUp*, 12 January. Available: https://www.groundup.org.za/article/dam-project-speeded-tackle-cape-town-water-crisis/. [10 August 2018].

Peters, H.P. 2013. Gap between science and media revisited: Scientists as public communicators. *Proceedings of the National Academy of Sciences*, 110 (3):14102-14109.

Petersen, T. 2018. ANC WC to request inquiry into whether City 'deliberately ignored' drought warnings. *News24*, 19 January. Available: https://www.news24.com/SouthAfrica/News/anc-wc-to-request-inquiry-into-whether-city-deliberately-ignored-drought-warnings-20180118. [10 August 2018].

Philander, R. 2017. Water: emergency plan unveiled. *Cape Argus*, 18 August:1.

Philander, R., & Dano, Z. 2017. Water: 'City not doing enough'. *Cape Argus*, 1 August:1.

Pielke Jr, R.A. 2005. Misdefining "climate change": consequences for science and action. *Environmental Science and Policy*, 8: 548–561.

Press Council. 2016. Code of ethics and conduct for South African print and online media. *Press Council*, 1 January. Available: http://www.presscouncil.org.za/ContentPage?code=PRESSCODE. [10 August 2018].

Price, V., Tewksbury, D. & Powers, E. 1995. *Switching trains of thought: The impact of news frames on readers' cognitive responses.* Paper presented at the annual conference of the Mid-west Association for Public Opinion Research, Chicago, IL.

Prince, L., & Barnard, M. 2018. Is dit nou 'Dag Zero' vir De Lille. *Die Burger*, 26 Januray:1.

Prince, L., & Theron, N. 2018. Mmusi: 'Cyril, gryp tog nou in!'. *Die Burger*, 30 January:1.

Quote Investigator. 2018. 'Research is to see what everybody else has seen and think what nobody has thought. *Quote Investigator.* Available: https://quoteinvestigator.com/2015/07/04/seen/ [5 April 2018].

Republic of South Africa. 1998. *Water Act of 1998* [Electronic]. Available: http://www.dwa.gov.za/Documents/Legislature/nw_act/NWA.pdf. [2018, August 10].

Russell, C. 2008. Climate change: Now what? *Columbia Journalism Review,* July/August. Available: https://archives.cjr.org/feature/climate_change_now_what.php. [5 April 2018].

Scheufele, D.A. & Tewksbury, D. 2007. Framing, agenda-setting, and priming: The evolution of three media effects models. *Journal of Communication*, 57 (2007):9-20.

Segel, E., & Heer, J. 2010. Narrative Visualisation: Telling stories with data. *Stanford University*. Available: http://vis.stanford.edu/files/2010-Narrative-InfoVis.pdf. [10 August 2018].

Sesant, S. 2017a. Dam levels near critical. *Cape Argus*, 18 January:1.

Sesant, S. 2017b. Water drill risks poisoning the wells. *Cape Argus*, 24 March:1.

Sesant, S., & Hlati, O. 2017. Water restrictions to be tightened. *Cape Argus*, 20 January:1.

Staff Writer, 2018. Day Zero moves to mid-May. *Cape Times*, 6 February:1.

Steenkamp, L. 2018. Why the drought levy tabled by Cape Town's mayor is unfair. *eNCA*, 17 January. Available: https://www.enca.com/opinion/why-the-drought-levy-tabled-by-cape-towns-mayor-is-unfair.[10 August 2018].

Stocking, H. & Leonard, J.P. 1990. The greening of the media. *Columbia Journalism Review*, 37–44.

Thom, L. 2018. Drought-stricken Cape Town, South Africa, could run out of water by April's 'day zero'. *ABC News*, 17 January. Available: https://abcnews.go.com/International/drought-stricken-cape-town-south-africa-run-water/story?id=52402170. [5 August 2018].

Top Universities. 2016. Top 10 universities in South Africa 2016. *QS Top Universities*, 20 July. Available: https://www.topuniversities.com/university-rankings-articles/brics-rankings/top-10-universities-south-africa-2016. [15 June 2018].

Tswanya, Y. 2018. How the rich are dealing with the water crisis. *Cape Argus*, 2 February:1.

Tuchman, G. 1978. *Making news: A study in the construction of reality*. New York: Free Press.

Ungar, S. 2000. Knowledge, ignorance and the popular culture: climate change versus the ozone hole. *Public Understanding of Science,* 9 (2000):297-312.

Van Dam, D. 2017. Cape Town contends with worst drought in over a century. *CNN*, 1 June. Available: https://edition.cnn.com/2017/05/31/africa/cape-town-drought/index.html. [17 June 2018].

Venktess, K. 2018. 'Composting toilets' and 'Day Zero' dominate Cape Town Google searches. *News24*, 2 February. Available: https://www.fin24.com/Tech/News/composting-toilets-and-day-zero-dominate-cape-town-google-searches-20180202. [10 August 2018].

Vliegenthart, R., & Van Zoonen, L. 2011. Power to the frame: Bringing sociology back to frame analysis. *European Journal of Communication*, 26(2):101-115.

Wallace, L. 2018. Food vs water – Where is the Cape's water really going? *News24*, 5 January. Available: https://www.food24.com/News-and-Guides/Features/food-vs-water-where-is-the-capes-water-really-going-20180105. [10 August 2018].

Wilson, K.M. 2000. Communicating climate change through the media: predictions, politics, and perceptions of risks, in Stuart Allen, Barbara Adam, and Cynthia Carter Eds. 2000. *Environmental risks and the media*. New York: Routledge, 201–217.

Winter, K. 2017. Personal email to kevin.winter@uct.ac.za. Received: 28 September 2017. Cape Town.

Winter, K., Carden, K., & Johnston, P. 2014. Water restrictions: too little too late? *University of Cape Town: Future Water Institute*. Available: https://kevinwinteruct.files.wordpress.com/2014/04/water-restrictions_too-little-too-late_final.pdf. [10 August 2018].

Wolski, P. 2017a. Is Cape Town's drought the new normal? *GroundUp*, 1 November. Available: https://www.groundup.org.za/article/cape-towns-drought-new-normal/. [10 August 2018].

Wolski, P. 2017b. How severe is this drought, really? *Climate Systems Analysis Group (CSAG)*, 28 August. Available: http://www.csag.uct.ac.za/2017/08/28/how-severe-is-this-drought-really/. [10 August 2018].

Wolski, P. 2017c. Water crisis – the more we know, the better we can respond. *GroundUp*, 16 November. Available: https://www.groundup.org.za/article/water-crisis-more-we-know-better-we-can-respond/. [10 August 2018].

Wolski, P. 2018. How severe is the drought? An analysis of the latest data. *GroundUp*, 22 January. Available: https://www.groundup.org.za/article/how-severe-drought-detailed-look-data/. [10 August 2018].

Wolski, P., Hewitson, B. & Jack, C. 2017. Why Cape Town's drought was so hard to forecast. *GroundUp*, 20 October. Available: https://www.news.uct.ac.za/news/cape-town-water-crisis/-article/2017-10-20-why-cape-towns-drought-was-so-hard-to-forecast. [10 August 2018].